

# FLORAE MALESIANAE PRAECURSORES LV. APOCYNACEAE IV. ALYXIA

F. MARKGRAF

Institut für Systematische Botanik der Universität,  
Zürich, Switzerland

## SUMMARY

An account of *Alyxia* Banks ex R. Br. in Malesia in which in all 57 species are distinguished, eight varieties (7 new), and one new subspecies. Twelve new species are proposed, one new combination, and one new name. Several species have been reduced.

Two genera have been merged with *Alyxia*, viz. *Paralstonia* Baill. and *Discalycia* Markgr.

The species are grouped according to their presumed natural affinity in 12 series and 2 subseries.

Keys are given to all series, subseries, species, and varieties.

The revision is concluded with a list of names of insufficiently known species and one of excluded names.

## 10. ALYXIA BANKS ex R. BR.

*Alyxia* Banks ex R. Br., Prodr. (1810) 469, *nom. conserv.*; Roxb., Fl. Ind. ed. Carey 2 (1824) 539—541; Bl., Bijdr. 16 (1826) 1030; DC., Prodr. 8 (1844) 345—348; Miq., Fl. Ind. Bat. 2 (1856) 406—409; B. & H., Gen. Pl. 2 (1876) 697; Hook. f., Fl. Br. Ind. 3 (1882) 634—637; Boerl., Handl. 2 (1899) 358, 393; K. & G., Mat. Fl. Mal. Pen. 19 (1907) 415—423; Merr., En. Born. (1921) 499; Merr., En. Philip. 3 (1923) 327—329; Ridl., Fl. Mal. Pen. 2 (1923) 332—334; Hutch., Fam. Fl. Pl. 1 (1926) 381; Markgr., Nova Guinea 14 (1928) 279—282; Markgr., Bot. Jahrb. 61 (1928) 179—187; Kerr in Craib, Fl. Siam. En. 2,5 (1939) 431—434; Pichon, Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 164—167; Bakh. f., Blumea 6 (1950) 389—390; Backer & Bakh. f., Fl. Java 2 (1965) 230.

*Gynopogon* Forst., Char. Gen. (1776) 35, *nom. rejic.*; K. Schum. in E. & P., Pfl. Fam. 4,2 (1895) 151—153. — *Paralstonia* Baill., Bull. Soc. Linn. Paris 1 (1888) 750; Pichon, Bull. Mus. Hist. Nat. Paris 2. sér. 21 (1949) 209, note. — *Discalycia* Markgr., Nova Guinea 14 (1928) 282—283; Bot. Jahrb. 61 (1928) 187—188. — *Pulassarium* [Rumph., Herb. Amboin. 5 (1747) 430] O.K., Rev. Gen. 1,2 (1891) 416.

Lianas, rarely erect or suberect shrubs, younger branches angular. *Leaves* decussate or whorled, mostly coriaceous, with many densely set lateral nerves, midrib prominent below. *Inflorescences* axillary or pseudoterminal, thyrsoid, sometimes reduced to one node with few to one flower(s). Bracts present, small. Flowers pentamerous. *Calyx* deeply split, its lobes ovate or lanceolate, without glands inside. *Corolla* small, salver-shaped, fragrant, white, tube cylindric, slightly inflated at the insertion of the stamens (generally near the mouth), inside with drooping hairs below the anthers, without mouth scales. Corolla lobes short, obliquely ovate, rarely lanceolate, overlapping to the left. *Anthers* ovate, with an obtuse tip, on short slender filaments. *Stigma* head globular or short-cylindrical, with 2 short tips, generally reaching the anthers. *Ovary* of 2 separate carpels, globose or dome-shaped, small. Ovules 2—6 in 2 rows. *Disc* a low ring or none. *Fruit* apocarpous, the 2 mericarps spreading, moniliform with narrow interstitials of several mm, or mostly reduced to 1—2 articles, black, with a thin fleshy mesocarp and a slightly hard endocarp, ellipsoidal, more rarely globular, 5—30 mm long. *Seeds* black, ruminate, solitary in every article, albumen horny. Embryo with oblong-elliptic cotyledons, about as long as the radicle.

**Distribution:** About 120 species (after removal of the Madagascan ones which were transferred to a separate genus *Cabucala* by Pichon), distributed from India through tropical Asia to S. China, N. Australia, and Polynesia, also in Hawaii. Centres of distribution are Malesia and New Caledonia.

**Notes:** *Alyxia* comprises also *Paralstonia* Baill., of which genus Pichon had occasion to study the type, and *Discalyxia* Markgr., linked to other *Alyxias* after they all had become better known.

In almost all species the branches are more or less angular when young. In the descriptions of the species the branches are described as angular when this character is conspicuous; in the species in which the branches are less markedly angular and soon becoming terete, this is not mentioned.

The inflorescences are always axillary. In some species, especially in the series *Discalyxia*, a synflorescence crowns the branch, but its single thyrsoid inflorescences spring from the axils of the uppermost leaves or bracts, and the vegetative shoot continues growing when the flowers have gone.

The colour of the flowers is white, but may change with age through yellowish to orange, even suffused with red. The fruits too change riping from green through orange to black. As a whole the fruits are produced frequently, so that the attribution of fruiting specimens to flowering ones remains doubtful only in few cases. The shape of the fruits is a constant differential character for some groups.

All parts of the plant contain cumarine. It gives an especial smell to the flowers and may still be observed when boiling flowers or fruits of old herbarium specimens for analysis. The branches are or were therefore used locally for perfuming and for bathing.

A presumed natural grouping of the species is here proposed for the first time, concerning at least the Malesian taxa. There is little means for distinguishing primitive and advanced groups; polymorphism shows itself by a space-network of characters. The numbered arrangement of series is to show only speciation in different directions. The most intricate group is series *Reinwardtinae*. It is also the most frequent and widespread one in the Malesian lowland rain forest. Related species occur beyond Malesia far to the NE. and E. Restricted areas are covered by the series *Alyxia*, *Globuliferae*, *Megalocarpae*, *Subalpiniae*, *Discalyxia*, and *Ruscifoliae*.

As a vernacular generic name is often mentioned '*pulassari*', already by Rumphius.

#### KEY TO THE SERIES OF MALESIAN ALYXIA

1. Leaves hard (sclerophyllous), with a spiny tip, their lateral nerves strong, straight, at an angle of 30° with the midrib. Corolla tube 6 mm long, lobes linear, acute. Stamens inserted near the middle of the corolla tube. Disc obvious. . . series **12. Ruscifoliae**
1. Leaves not sclerophyllous, without a spiny tip, their lateral nerves slender, not quite straight into the margin, at an angle of 60—80° with the midrib. Corolla tube 2—4 or 5—12 mm long, lobes ovate or ovate-lanceolate. Stamens generally inserted near the mouth, rarely deeper. Disc none or indistinct, except in series *Discalyxia*.
  2. Inflorescence remarkably loose and lax, with long internodes. Corolla buds acuminate or acute, lobes ovate-lanceolate, acute.
  3. Leaves 3- or 4-whorled, rather chartaceous, oblong-lanceolate or narrowly elliptic, gradually acuminate into the tip. Inflorescence 2—5 cm long, peduncle 1—3 cm. Corolla tube 7 mm long. Fruit articles (where known) one to each mericarp, rarely up to 4 . . . . . series **10. Laxiflorae**

3. Leaves (3—)4—7-whorled, coriaceous, elliptic or broad-elliptic to obovate, suddenly and very shortly acuminate at the tip. Inflorescence 5—22 cm long, peduncle 3—13 cm long. Corolla tube 2—3 mm long. Mericarps as a rule with 6 articles each. . . . . series 11. **Discalyxia**
2. Inflorescence  $\pm$  dense, not lax, with short internodes. Corolla buds obtuse, lobes short-ovate, obtuse.
  4. Corolla tube 2—4 mm long.
    5. Leaves subcoriaceous, linear-lanceolate, only 0.8—1.2(—1.5) cm broad (1.5—7.5 cm long). Fruit articles  $8 \times 7 \times 7$  mm. . . . series 9. **Microphyllae**
    5. Leaves coriaceous, not linear-lanceolate, broader (only in *A. royeniana* 1.2  $\times$  0.8 cm). Fruit articles generally larger than  $8 \times 7 \times 7$  mm.
    6. Leaves  $\pm$  obovate, obtuse, small, at the most  $5 \times 3$  cm. Inflorescence much reduced, often 3- or 1-flowered. . . . . series 8. **Subalpiniae**
    6. Leaves  $\pm$  elliptic, larger than  $5 \times 3$  cm. Inflorescence generally richer, with (1—)2—5 nodes at the main axis.
    7. Leaves strongly coriaceous, index generally 2:1. Inflorescence with 3—5 nodes. Fruit articles large,  $16 \times 9 \times 9$  to  $30 \times 15 \times 15$  mm.
      - series 6. **Floribundae**
    7. Leaves coriaceous, index generally 3:1. Inflorescence with 2—3 nodes at the main axis. Fruit articles shorter.
      8. Leaves acuminate, lateral nerves distinct, 1 mm spaced. Inflorescence rather open (internodes distinct). Flowers shortly but distinctly pedicellate. Calyx lobes obtuse. Fruit articles  $10 \times 6 \times 6$  to  $12 \times 8 \times 8$  mm (larger in *A. sulana*) . . . . . series 7. **Defoliatæ**
      8. Leaves obtuse or shortly acuminate, lateral nerves indistinct, 2—3 mm spaced. Inflorescence rather condensed (internodes very short). Flowers  $\pm$  sessile. Calyx lobes acuminate. Fruit articles subglobose,  $10 \times 9 \times 9$  to  $15 \times 12 \times 12$  mm . . . . . series 2. **Alyxia**
    4. Corolla tube (5—)7—12 mm long.
      9. Leaves 10—15 cm long. Corolla buds slightly acutish, but lobes obtuse, about  $\frac{1}{3}$  as long as the tube. Corolla tube 8—9 mm long. Fruit articles 1(—2) to each mericarp, acuminate, subtended by a stalk (stipe above the calyx) of 15 mm, 20—30  $\times$  10 to  $12 \times 10$ —12 mm . . . . . series 5. **Megalocarpæ**
      9. Leaves shorter. Corolla buds obtuse, lobes obtuse, generally shorter than  $\frac{1}{3}$  of the tube. Fruit articles 1—4 to each mericarp, obtuse, with a shorter stalk, articles not longer than 15 mm.
        10. Mericarps moniliform, their articles 4(—6), globular, 5—6 mm in diam. Corolla tube 7—8 mm long. . . . . series 4. **Globuliferae**
        10. Mericarps with only 1—2 articles, these larger, ellipsoidal,  $9 \times 7 \times 7$  to  $15 \times 10 \times 10$  mm. Corolla tube 5—12 mm long.
          11. Leaves obtusely lanceolate or obtusely broad-lanceolate, lateral nerves indistinct on either face. Fruit articles short-ellipsoidal or subglobular . . . . . series 3. **Laurinae**
          11. Leaves elliptic or lanceolate-elliptic to obovate, lateral nerves distinct or not. Fruit articles ellipsoidal . . . . series 1. **Reinwardtiana**

## Series I. REINWARDTIANAE Markgr., n. ser.

Frutices scandentes fortes vel subfortes. *Folia* 3- ad 4-verticillata, coriacea, elliptica vel obovata, plerumque brevioras quam 15 cm. *Inflorescentiae* breves, densiusculae, 1- ad 2-raro 3-nodes. *Calyx* pubescens. *Tubus corollae* inter 5 et 12 mm secundum speciem ambigens. *Articuli fructuum* ellipsoidei vel subgloboso-ellipsoidei, 8—15 mm longi, 1—2 in utroque mericarpio, rarissime 3 (in *A. pullei*).

Type: *Alyxia reinwardtiana* Bl.

Distribution: A large series, composed of 3 well definable but interrelated sub-series within Malesia, one of which, subseries *Reinwardtianae*, seems especially widely spread in the whole of Malesia, Thailand, Indochina, China, and even to Polynesia and Hawaii.

## KEY TO THE SUBSERIES OF SERIES REINWARDTIANAE

1. Lateral nerves of leaves 1—2 mm spaced. Calyx lobes obtuse. Corolla tube 10—12 mm long. Fruit articles  $11 \times 8 \times 8$ — $18 \times 10 \times 10$  mm . . . . . subseries 1a. **Clusiaceae**
1. Lateral nerves of leaves 2—3 mm spaced. Calyx lobes acute. Corolla tube 5—10 mm long. Fruit articles  $8 \times 7 \times 7$ — $15 \times 9 \times 9$  mm.
  2. Leaves thickly coriaceous, with recurved margins, lateral nerves indistinct. Corolla tube 7—8 mm long. . . . . subseries 1b. **Pilosae**
  2. Leaves less coriaceous, their margins not or scarcely recurved, lateral nerves distinct. Corolla tube 5—10 mm long . . . . . subseries 1c. **Reinwardtianae**

1a. Subseries **Clusiaceae** Markgr., n. subser.

Frutices scandentes fortes. *Folia* coriacea, magna, obtusa. *Inflorescentiae* axillares, breves, densae, pubescentes. *Tubus corollae* 10—12 mm. *Articuli fructuum* ellipsoideales, satis magni, 10— $15 \times 8$ — $12 \times 8$ —12 mm.

Type: *Alyxia clusiacea* (Baill.) Pichon (= *Paralstonia clusiacea* Baill.).

Distribution: 4 species, whereof 3 in the Philippines, 1 in New Guinea.

## KEY TO THE SPECIES OF SUBSERIES CLUSIACEAE

1. Leaves oblong or oblong-obovate. Inflorescence rather long-pubescent. Corolla tube 10—12 mm.
  2. Leaves 6— $10 \times 2.5$ —4 cm. Inflorescences sessile or subsessile. Corolla tube 10 mm. Fruit articles  $15 \times 10 \times 10$  mm . . . . . 1. **A. clusiacea**
  2. Leaves 12— $15 \times 4$ —5 cm. Peduncle of inflorescence 6—8 mm. Corolla tube 11—12 mm. Fruit articles  $15$ — $18 \times 8$ —12 mm. . . . . 2. **A. sibuyanensis**
1. Leaves broad-elliptic, short. Inflorescences short-pubescent. Corolla tube 10 mm.
  3. Leaves obovate, obtuse or retuse, 5— $9 \times 2.5$ —5 cm. Fruit articles  $11$ — $12 \times 8 \times 8$  mm. . . . . 3. **A. retusa**
  3. Leaves broad-elliptic, very short-acuminate, 8— $12 \times 4$ —6 cm. Fruit articles  $14 \times 11 \times 11$  mm. . . . . 4. **A. lata**

1. **Alyxia clusiacea** (Baill.) Pich.

*A. clusiacea* (Baill.) Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166; Pich., Bull. Mus. Hist. Nat. Paris 2 sér. 21 (1949) 209 (note). — *Paralstonia clusiacea* Baill., Bull. Soc. Linn. Paris 1 (1888) 750. — *A. confertiflora* Merr., Philip. J. Sc. 10 (1915) Bot. 64; Merr., En. Philip. 3 (1923) 327.

Liana. Branches slightly quadrangular. Leaves 4-whorled, coriaceous, glabrous, oblong, obtuse, rarely sub-acuminate, base sinuately narrowed, 6—12 × 2—3.5 cm, lateral nerves rather indistinct, 2 mm distant, petiole 10—15 mm. Inflorescences axillary, clustered, sessile or subsessile, pubescent. Flowers sessile. Calyx lobes 2 × 1.2 mm, pubescent. Corolla tube 10 mm, glabrous outside, lobes obliquely ovate, 3 mm long, forming an obtuse bud. Anthers 1 mm long, inserted immediately below the mouth. Ovary 0.7 mm high, pubescent. Mericarps with 1 ellipsoidal article, 15 × 10 × 10 mm. Cotyledons of the embryo linear, obtuse, 7.5 × 1.2 mm, radicle 3.5 × 1 mm.

PHILIPPINES. Luzon. For. Bur. 30892, Tayabas Prov., Calauag; Barthe s.n. (médecin de la frégate 'La Sibylle' 1857), Manila. — Mindoro. Malinwanag 211, Bongabong & Pinamalayan; PNH 17770, 39896, Bongabong; PNH 17560, 17641, 17705, Mt. Yagaw. — Negros. PNH 40402, Dumaguete-Sibulan. — Mindanao. BS 24942, Bukidnon Subprov., Tanculan; PNH 10762, Agusan Prov., Caba-daran, Mt. Hilong-Hilong, 1066 m. — Basilan. BS 16143.

## 2. *Alyxia sibuyanensis* Elm.

*A. sibuyanensis* Elm., Leaf. Philip. Bot. 4 (1912) 1448; Merr., En. Philip. 3 (1923) 328; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166. — *A. revoluta* Merr., Philip. J. Sc. 13 (1918) Bot. 52; En. Philip. 3 (1923) 328; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Liana. Leaves 4-whorled, coriaceous, glabrous, elliptic-oblong to obovate-oblong, 13—18 × 3.5—6 cm, obtuse or short-acuminate, base sinuately narrowed, lateral nerves numerous, 2—3 mm distant, petiole 1—3 cm. Inflorescences stout, 1- to 3-noded, pubescent, peduncle 1—3 cm, flowers subsessile. Calyx lobes broad-ovate, 2—3 × 1.2—1.5 mm. Corolla tube 11—12 mm, glabrous outside, lobes broad-ovate, 4 mm long, their bud obtuse. Anthers 1.2 mm long. Ovary ellipsoidal, 1 mm high, short-pilose in the upper part. Mericarps with 1—2 ellipsoidal articles, 15—18 × 8—12 mm. Cotyledons of the embryo oblong, obtuse, 5 × 1.3 mm, radicle 3 × 0.8 mm.

PHILIPPINES. Luzon. BS 28582, Tayabas Prov., Mt. Binnang. — Sibuyan. Elmer 12137a, Capiz Prov., Magallanes, Mt. Giting-Giting. — Negros: PNH 21966, Mt. Canlaon.

NEW GUINEA. West. Vogelkop: Van Royen & Sleumer 7137, Aifai R. valley, Tamrau Mts., path from Wamui R. camp to water divide, Wamsuf area, 1400 m.

## 3. *Alyxia retusa* Merr.

*A. retusa* Merr., Philip J. Sc. 14 (1919) 448; Merr., En. Philip. 3 (1923) 328; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Liana. Branches angular. Leaves 4- to 5-whorled, well coriaceous, glabrous, broad-obovate or broad-elliptic, 5—9 × 2.5—5 cm, rounded or retuse at the tip, base sinuately narrowed, margins slightly revolute, lateral nerves numerous, indistinct, petiole stout, 1—2 cm. Inflorescences axillary, short, few-flowered, pubescent, 1-noded, peduncle 5—6 mm long. Calyx lobes ovate, acutish, 2 × 1.2 mm. Corolla tube 10 mm, glabrous outside, lobes suborbicular, 2.5 mm. Anthers 1.3 mm long, inserted at the mouth. Ovary globular, 0.7 mm high, setose. Mericarps with 1—2 articles, 10—12 × 8 × 8 mm.

PHILIPPINES. Luzon. BS 33330, Ilocos Norte Prov., Mt. Palimlim; PNH 17898, Ilocos Norte, Mt. Quebrada.

## 4. *Alyxia lata* Markgr.

*A. lata* Markgr., Bot. Jahrb. 61 (1928) 187; Kaneh. & Hatus., Bot. Mag. Tokyo 55 (1941) 493; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Liana. *Branches* triangular. *Leaves* 3-whorled, coriaceous, glabrous, broad-elliptic, very short-acuminate, 8—12 × 4—6 cm, lateral nerves very numerous, 1 mm distant, petiole stout, 5 mm long. *Inflorescences* thyrsoid, 3-noded, peduncle 5—15 mm, bracts and pedicels pubescent. *Calyx* lobes ovate, scabrous-pubescent, 2 × 1.5 mm. *Corolla* tube 12 mm, glabrous outside, lobes ovate, 3 mm long. *Anthers* 1.5 mm long, inserted at the mouth. *Ovary* ellipsoidal, 1.2 mm high, pilose. *Mericarps* with 1 article, 14 × 11 × 11 mm.

MOLUCCAS. Kei Islands. *Beccari s.n.* (Fl 6361), Kei Ketjil, Tual.

NEW GUINEA. West. Miosnom I. (Geelvink Bay): *Beccari s.n.* (Fl 6360). — East. Morobe Dist.: NGF 27538, Bulolo, Patep village, 1350 m.

#### 1b. Subseries *Pilosae* Markgr., n. subser.

*Folia* valde coriacea, plerumque 3- ad 4-verticillata. *Inflorescentiae* breves, pauciflorae, bi- vel 3 nodes, nodis valde approximatis. *Calyx* plerumque pubescens. *Tubus corollae* 6—8 mm. *Articuli fructuum* plerumque singuli, plerique 8 × 7 × 7 mm.

Type: *Alyxia pilosa* Miq.

Distribution: 8 species from the Malay Peninsula through Sumatra, Java, and Borneo to New Guinea, one of them, *A. pilosa*, especially frequent and widespread.

#### KEY TO THE SPECIES OF SUBSERIES PILOSAE

1. Leaves ± pilose below\*). *Calyx* hirsute. *Ovary* stiffly setose.
  2. Leaves mostly large, elliptic, more rarely obovate, short-acuminate, densely pilose below, 12.5 × 3 cm, petiole 5—15 mm long. *Corolla* lobes glabrous above, often pubescent outside. . . . . 5. *A. pilosa*
  2. Leaves narrowly elliptic, finely papillose below, obtuse, petiole 3—5 mm long. *Corolla* lobes ciliate. . . . . 6. *A. pachyphylla*
1. Leaves glabrous. *Calyx* pubescent or glabrous. *Ovary* hairs not stiff.
  3. Leaves obtuse. Fruit articles 8 × 7 × 7 mm.
    4. Leaves obovate, 6—10 × 2—5 cm, with cuneate base.
      5. Liana. Leaves 4-whorled, 4—5 cm broad. *Calyx* lobes acute. *Corolla* tube 6 mm long . . . . . 7. *A. winckelii*
      5. Shrub. Leaves 5-whorled, 2—3 cm broad. *Calyx* lobes obtuse. *Corolla* tube 7—8 mm long . . . . . 8. *A. pullei*
    4. Leaves oblong-elliptic, shorter, 2—3 × 0.8—0.9 cm. . . . . 9. *A. mujongensis*
  3. Leaves acute or distinctly acuminate, not obovate.
    6. Leaves elliptic-ovate. Fruit articles 10 × 8 × 8 mm . . . . . 10. *A. oleifolia*
    6. Leaves lanceolate. Fruit articles 8 × 7 × 7 mm.
      7. Leaves lanceolate to elliptic-lanceolate, up to 5 × 1.5 cm. *Corolla* tube 8 mm long. . . . . 11. *A. angustifolia*
      7. Leaves linear-lanceolate, up to 6 × 0.8 cm. *Corolla* tube 7 mm long. . . . . 12. *A. pagonensis*

#### 5. *Alyxia pilosa* Miq.

*A. pilosa* Miq., Fl. Ind. Bat. 2 (1856) 408; Sum. (1860) 228; Benth. & Hook. f., Gen. Pl. 3 (1882) 635; Boerl., Handl. 2 (1899) 393; King & Gamble, Mat. Fl. Mal. Pen. (1907) 416; Merr., En. Borneo (1921) 499; Ridl., Fl. Mal. Pen. 2 (1923) 332; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 165. — *A. ganophylla* Markgr.,

\*) This indument consists of short thick protrusions of the epidermal cells and of few longer hairs in between. These may have vanished; then the lower leaf surface looks only papillate.

Bot. Jahrb. 60 (1926) 315. — *A. induta* (K. Schum.) Markgr., Bot. Jahrb. 60 (1926) 315 in annot. — *A. markgrafiana* O. Schwartz, Mitt. Inst. Allg. Bot. Hamb. 7 (1931) 258. — *Gynopogon indutus* K. Schum., *nomen nudum* in sched.

Liana. Younger *branchlets* grey-tomentose. *Leaves* thickly coriaceous, (2—)3—4-whorled, elliptic to obovate-elliptic, with cuneate-decurrent base and short-acuminate tip, shining and sometimes rough on the upper surface, but soon glabrate, dull and tomentose below, margins strongly recurved, (4—)7.5—12.5 × (1.3—)2.5—3.5 cm, midrib stout, prominent below, lateral nerves 15—25 pairs, almost horizontal, 3 mm distant, often indistinct below, petiole stout, 0.5—1.5 cm long. *Inflorescences* axillary, grey-tomentose, with 2 nodes and a very short internode, peduncle 0.5—3 cm, pedicels 1—2 mm long. *Calyx* lobes acute, 2.5 mm long, tomentose. *Corolla* white, tube 8 mm, tomentose outside, sometimes glabrescent, lobes obliquely ovate, tomentose below, 3 × 2 mm, in bud obtuse. *Anthers* 1.5 mm long, inserted at the mouth. *Ovary* ovate, 0.5 mm high, densely tomentose. *Merica*rp with 1—2 articles, these almost contiguous, ellipsoidal, 10—12.5 × 6—9 × 6—9 mm.

**Distribution:** Malay Peninsula (Perak, Pahang, Selangor, Malacca, Johore, Singapore), Sumatra, Bangka, Biliton, Borneo. Numerous collections.

**Note.** The indument consists of short protrusions of the epidermal cells and of longer hairs in between. If these have vanished or are not well developed, the surface looks papillate only.

## 6. *Alyxia pachyphylla* Merr.

*A. pachyphylla* Merr., J. Str. Br. R. As. Soc. 77 (1917) 237; Merr., En. Born. (1921) 499; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Liana. Younger *branches* pubescent, soon becoming terete, at first rough by the hair remnants. *Leaves* 4-whorled, thickly coriaceous, glabrous, elliptic, obtuse, base rounded, margins strongly recurved, 3—6 × 1.2—2.5 cm, shining above, pale and finely papillose below, lateral nerves indistinct on either surface, 2—3 mm distant, petiole 3—5 mm long. Leaves of apical branches oblong-elliptic, short-acuminate, up to 7 × 1.5 cm. *Inflorescences* axillary, with 2 nodes and a very short internode, hirsute, peduncle about 1 cm long. *Calyx* lobes ovate, 2 mm long, pilose. *Corolla* tube 5—6 mm long, glabrous outside, lobes suborbicular, 1.8 × 1.5 mm, glabrous. *Anthers* 1.2 mm long, inserted slightly above the middle of the tube. *Ovary* globular, 0.7 mm, setose. *Merica*rps with 1 ellipsoidal article, 8 × 6.5 × 6.5 mm.

BORNEO. Sarawak. *Sarawak Museum* 148; Hallier 2311, Gunung Klam; BS 2224, Mt. Santubong; Richards 1116, Mt. Dulit, Ulu Tinjar (4th div.). — S a n d a k a n. SAN A 4187, Lahad Datu, summit of Mt. Silam, 850 m.

## 7. *Alyxia winckelii* Bakh. f.

*A. winckelii* Bakh. f., Blumea 6 (1950) 390; Backer & Bakh. f., Fl. of Java 2 (1963) 230.

Liana. *Branches* angular. *Leaves* 4-whorled, well coriaceous, glabrous, elliptic to obovate, short-acuminate, base cuneate, 6—10 × (2—)4—5 cm, lateral nerves visible above, 2—3 mm distant, indistinct below, petiole stout, 5—10 mm long. *Inflorescences* axillary, one-noded, few-flowered, peduncle 4—6 mm long. *Calyx* lobes ovate, acute, pubescent and ciliate, 2 mm long. *Corolla* tube in bud 6 mm long, glabrous outside, lobes ovate, 2 × 1.2

mm. *Anthers* 1.2 mm long, inserted at the mouth. *Ovary* globular, setose, 0.7 mm. *Fruit* unknown.

JAVA. Res. Preanger: *Winckel* 685, Gunung Limus, Tjimonteh, south of Tjibeber; *Bakhuizen van den Brink* s.n., Tjidadap, Tjibeber, 1000 m.

### 8. *Alyxia pullei* Markgr.

*A. pullei* Markgr., Nova Guinea 14 (1926) 281; Bot. Jahrb. 61 (1928) 186; Kaneh. & Hatus., Bot. Mag. Tokyo 55 (1941) 492; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Erect shrub 1.5 m. *Branches* angular. *Leaves* 5-whorled, well coriaceous, glabrous, obovate, obtuse or retuse, base cuneate-decurrent, 6—10 × 2—4 cm, lateral nerves 2 mm distant, indistinct below, petiole stout, 0.5—1 cm. *Inflorescence* with 1—2 nodes, peduncle 0.5—1 cm, every node with 2 dichasia. Flowers sessile. *Calyx* lobes ovate, obtuse, 2.5 mm long, glabrous but ciliate. *Corolla* tube 7—8 mm long, glabrous outside, lobes obliquely ovate, 3 × 2 mm, glabrous. *Anthers* 1.5 mm long, inserted at the mouth. *Ovary* 0.5 mm high, setose. *Mericarps* moniliform, with few almost contiguous articles of 8 × 7 × 7 mm.

NEW GUINEA. W e s t. Wissel Lake region: *Eyma* 4515, Mairie I. in Lake Paniai, 1760 m; *Eyma* 5422, track to Bubeiro bivouac. — Snow Mts.: *Pulle* 952, summit of Mt. Hellwig.

### 9. *Alyxia mujongensis* Markgr., n.sp.

Frutex scandens vel sarmentosus. *Rami* graciles, pubescentes. *Folia* 3- ad 4-verticillata, bene coriacea, glabra, ovato-oblonga, obtusa, basi rotundato-angustata, 2—4 × 0.8—1.3 cm, nervi laterales indistincti, petiolus 2—4 mm longus. *Inflorescentiae* axillares, uninodes, triflorae, pedunculus 3 mm longus. *Calycis lobi* ovato-lanceolati, pubescentes, 1 mm longi. *Corolla* deest. *Mericarpi* uniarticulata (probabiliter), articulus 8 × 7 × 7 mm. Embryonis cotyledones oblongi, plani, obtusi, 1.5 × 1 mm, radícula 3.5 mm longa (in statu praesente).

T y p e: *S* 21186: Sarawak, Ulu Chenaning, Amau, Mujong, Balley, 950 m (L).

BORNEO. S a r a w a k. *S* 21186, Ulu Chenaning. Amau, Mujong, Balley, 950 m; *S* 21117, *S* 21205, Bukit Lumut, Carapa Amau, Ulu Mujong, Hose Mts.

E c o l o g y: Heath forest on sandstone.

### 10. *Alyxia oleifolia* King & Gamble.

*A. oleifolia* King & Gamble, Mat. Fl. Mal. Pen. (1907) 419; Ridley, Fl. Mal. Pen. 2 (1923) 333; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Liana. *Leaves* thickly coriaceous, mostly 3-whorled, glabrous, elliptic or elliptic-lanceolate, tip short-acuminate or acute, base various, margins recurved, 2.5—6 × 1.2—2.5 cm, shining above, lateral nerves indistinct, horizontal, petiole stout, 4—6 mm long. *Inflorescences* axillary, few-flowered, finely pubescent, rather lax, one-noded. Peduncle 3—5 mm. *Calyx* lobes 2 mm long, pubescent, acute. *Corolla* tube 8 mm long, glabrous outside, lobes 3—3.5 mm long, obtuse, ovate. *Anthers* 1.3 mm long, inserted below the mouth. *Ovary* ovate, 0.7 mm high, pilose. *Mericarps* with 1—2 subglobular articles 10 × 8 × 8 mm. Cotyledons of the embryo oblong, 2.5 mm long, flat, radicle 3.5 mm long.



**10a. var. *oleifolia***

*Leaves* elliptic to ovate-elliptic, large,  $2.5 \times 1.2$ — $6 \times 3$  cm, base rounded or roundly and very shortly narrowed.

MALAY PENINSULA. *P e r a k*. *King's coll.* 7405 (type); *Wray* 3846, *Cantley s.n.*, G. Bubu, 1500—1600 m. — *P a h a n g*. *Henderson* 23585, *Holtum s.n.*, G. Batu Brinchang, 2000 m; *Stone* 8428, 10478, G. Ulu Kali, summit, 1800 m. — *S e l a n g o r*. *Ridley s.n.*, Ulu Semangkok; *Burkill* 8871, Semangkok Pass, immediately south of the gap, 1170 m; *Burn-Murdoch* 11965, Semangko Pass, 1330 m.

SUMATRA. *Van Steenis* 8551, Gaju & Alas lands, Mt. Losir, biv. 5 to 6, 2900 m.

BORNEO. *S a r a w a k*. *Haviland s.n.*, Serapi; *Nooteboom & Chai* 2053, Kalabit Highlands, Mt. Murud, 2200 m. — *S a b a h*. *SAN* A443, Bangawan Forest Reserve; *Clemens* 33214, Kinabalu, Marai Parai, 1500 m; *SF* 27644, Kinabalu, above Paka-Paka, 2900 m.

**10b. var. *tenuifolia* Ridl.**

var. *tenuifolia* Ridl., *Fl. Mal Pen.* 2 (1923) 333. — *A. kinabaluensis* Markgr., *Mitt. Bot. Staatssamml. Münch.* 1 (1950) 26.

*Leaves* lanceolate, narrow,  $2$ — $5 \times 1$ — $1.5$  cm, base cuneate.

MALAY PENINSULA. *P a h a n g*. *Burkill* 725, Cameron Highlands, Tanah Rata; *Holtum s.n.*, G. Batu Brinchang, 2000 m. — *S e l a n g o r*. *Robinson s.n.* (2.2.13), G. Menkuang Lebah, 1500 m.

SUMATRA. *Bünnemeyer* 4078, G. Malintang, 2260 m; *Van Steenis* 9032, Gaju & Alas Lands, from bivouac 'Halfweg' to bivouac 'top', Goh Lembuh, 2600 m.

BORNEO. *S a b a h*. Kinabalu: *Clemens* 33817, Colombon R., 2700 m; 30326, upper Kinabalu; *SAN* 27644, below Paka-paka, 2900 m; 29176, Kinabalu, above Kambarongo, 2250 m.

**N o t e.** In var. *tenuifolia*, even at the type specimen, no other differential characters could be realized than the leaf shape. This has no phytogeographical significance.

**11. *Alyxia angustifolia* Ridl.**

*A. angustifolia* Ridl., *J. Fed. Mal. St. Mus.* 6 (1915) 161; Ridl., *Fl. Mal. Pen.* 2 (1923) 333; Pich., *Mém. Mus. Hist. Nat. Paris n.s.* 27 (1948) 166.

Slender liana or sarmentose shrub. *Leaves* 3- to 4-whorled, thickly coriaceous, glabrous, lanceolate to elliptic-lanceolate,  $2$ — $5 \times 0.6$ — $1.5$  cm, base rounded, tip acute or very shortly acuminate, lateral nerves indistinct, petiole 3 mm long, margins revolute. *Inflorescences* axillary, with 1, rarely 2 nodes, peduncle 0.8—1.2 cm, puberulous. *Calyx* lobes linear, acute, pubescent, 1.5—2 mm long. *Corolla* tube 8 mm long, lobes ovate,  $3.5 \times 3$  mm, papillose above. *Anthers* 1.3 mm long, inserted at the mouth. *Ovary* globose, 0.8 mm high, setose. *Mericarps* with 1 article  $8 \times 7 \times 7$  mm.

MALAY PENINSULA. *P a h a n g*. *Ridley* 16060, *Kloss* 12127, *Seimund* 219, *Holtum s.n.*, G. Tahan; *Evans* 10796, G. Benom; *Shah* 1465, G. Tuan Set. — *K e l a n t a n*. *Soepadmo & Mahmud* 1074, G. Rabong, 1025 m. — *S e l a n g o r*. *Ding Hou* 718, Batu Cave, 200 m.

**12. *Alyxia pagonensis* Markgr., n.sp.**

Arbuscula. *Rami* dichotomi, teretes, iuniores angulosi et pubescentes. *Folia* 3- ad 4-verticillata, bene coriacea, glabra, lineari-lanceolata,  $4.5$ — $6 \times 0.6$ — $0.8$  cm, breviter acuminata, basi cuneata, marginibus recurvis, supra lucida, nervi laterales indistincti, costa crassa, subtus prominens, petiolus 3 mm longus. *Inflorescentiae* axillares, uninodes, pubescentes, pedunculus  $2$ — $7$  mm, pedicelli 1—2 mm longi, bractae lineares. *Calycis lobis*

lanceolati, 1.5—2 mm longi, puberuli et ciliati. *Corollae* albae tubus 7 mm longus, extus papillatus, lobi ovati,  $2.4 \times 1.8$  mm, alabastrum acutiusculum formantes. *Antherae* 0.9 mm longae, prope faucem insertae. *Ovarium* globosum, 0.7 mm altum, setosum. *Fructus* incogniti.

**Type:** BRUN 1886, Brunei, Pagon Ridge, 1500 m (L).

BORNEO. Brunei. BRUN 1886, 2299, Pagon Ridge, moss forest on sandstone and shale ridge, 1500 m. — Sabah. Meijer 55663, Beaufort Distr., Bukit Sunggau Weston, kerangas forest, whitish sandy soil, on ridge.

### 1c. Subseries *Reinwardtiana* Markgr., n. subser.

Frutices scandentes. *Folia* subcoriacea vel coriacea, margine non vel vix revoluta, mediocria (2.5—10 cm longa). *Inflorescentiae* densae, pedunculo brevi suffultae. *Tubus corollae* 5—10 mm longus. *Articuli fructuum* breviter ellipsoidei,  $10-15 \times 7-9 \times 7-9$  mm.

**Type:** *Alyxia reinwardtii* Bl.

**Distribution.** This subseries is represented in Malesia only by one polymorphous and widespread species, *A. reinwardtii* Bl. According to descriptions, figures, and some herbarium specimens, also outside Malesia represented by a remarkable number of related species, as e.g. *A. flavescens* Pierre, *A. crassifolia* Pit., *A. marginata* Pit. in Indochina, *A. kweichowensis* Tsiang & Li in China, *A. celsistrinea* Schltr. in New Caledonia, *A. bracteolosa* Rich. in Polynesia, and *A. olivaeformis* Gaud. in Hawaii, *A. stellata* Forst. in New Caledonia and in several Pacific Islands.

### 13. *Alyxia reinwardtii* Bl.

*A. reinwardtii* Bl., Cat. (1823) 43; Bijdr. (1826) 1031; Kerr, Fl. Siam. En. 2 (1939) 432; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 165; Back. & Bakh.f., Fl. Java 2 (1965) 230. — *A. stellata* auct. non Roem. & Sch.: DC., Prodr. 8 (1844) 346, p.p.; Miq., Fl. Ind. Bat. 2 (1856) 407, p.p.; Boerl., Handl. 2 (1899) 399. — *Gynopogon reinwardtii* Koord., Exk. Fl. Java 3 (1912) 74; Hochr., Candollea 5 (1931) 179.

Lianas. *Leaves* 3- to 4-whorled, subcoriaceous to coriaceous, glabrous, elliptic to lance-elliptic or obovate, shorter than 15 cm; lateral nerves distinct, 2—3 mm spaced. *Inflorescence* dense, peduncle very short. *Calyx* lobes acute, pubescent. *Corolla* tube glabrous outside, 5—10 mm long. *Fruit* articles short-ellipsoidal,  $10-15 \times 7-9 \times 7-9$  mm.

**Distribution.** Andaman Islands, Thailand, Indochina, Yunnan, Malay Peninsula, Sumatra, Java, Borneo, Philippines (Palawan and Culion), SW. Celebes.

**Note.** A polymorphous species. Especially var. *reinwardtii* and var. *lucida*, though in typical samples recognizable by the characters mentioned in the key, show sometimes transitions in the shape of leaves and fruit articles.

#### KEY TO THE VARIETIES OF ALYXIA REINWARDTII

1. Corolla tube 5—6 mm long.
  2. Leaves lanceolate, long-acuminate,  $(3-5)-5-6.5 \times (1-1.5)-2$  cm. Calyx  $\pm$  long-hirsute, hairs at the tips of the sepals more dense . . . . . 13a. var. *cinerea*
  2. Leaves short-acuminate or obtuse, elliptic or obovate. Calyx loosely pubescent or glabrous.
    3. Leaves elliptic,  $2.5-8 \times 1-4$  cm. Corolla tube 5—6 mm long.
    4. Leaves broad-elliptic,  $5-8 \times 3-4$  cm. Peduncle 5—10 mm long.

13b. var. *insularis*

4. Leaves elliptic, 2.5—5 × 0.7—2 cm. Peduncle 1—2 mm long. 13c. var. *pumila*
3. Leaves narrowly obovate, 4—7 × 1.5—2 cm. Corolla tube 6 mm long. 13d. var. *obovatula*
1. Corolla tube longer than 6 mm.
5. Corolla tube 7—8 mm long. Leaf shape various.
6. Leaves generally shorter than 10 cm, mostly obtuse or only short-acuminate. Fruits often numerous in a fructescence, their articles 12 × 8 × 8 mm. 13f. var. *lucida*
6. Leaves generally longer, 6—10 × 2—3.5 cm, acuminate. Fruits less numerous in a fructescence, their articles longer, 13—15 × 8—9 × 8—9 mm. 13e. var. *reinwardtii*
5. Corolla tube 10 mm long. Leaves generally longer acuminate. 13g. var. *meiantha*

**13a. var. *cinerea* (Bakh. f.) Markgr., n. stat.**

*A. cinerea* Bakh.f., Blumea 6 (1950) 390; Backer & Bakh.f., Fl. Java 2 (1965) 230.

Liana. Leaves 3-whorled, coriaceous, glabrous, lanceolate, shortly acuminate, base decurrent, shining above, below with some remnants of hairs, 5—9 × 1.2—2 cm, lateral nerves about 2 mm distant, petiole 5—8 mm long. Inflorescences axillary, slightly hirsute, with 2 nodes, peduncle 2—3 mm long, pedicels 1—2 mm long. Calyx lobes ovate, acute, 1.5 mm long, hirsute, glabrescent, but ciliate. Corolla tube 5—6 mm long, glabrous outside, lobes ovate, 2 × 1.5 mm. Anthers apiculate, 1.5 mm long, reaching the mouth of the tube. Ovary globose, 0.5 mm high, setose. Mericarp with 1—2 ellipsoidal articles, 10 × 8 × 8 mm.

JAVA. Blume s.n., 'Java' (type); Van Hasselt s.n., Preanger; Van Hasselt 640, Pangerango; Van Ooststroom 13799, Tjibodas, Gedeh, Sinapeul, Valley of Tjikundul stream, 1300 m.

BALL. Sarip 461, G. Patas.

**Note:** The length of the fruit article cited in the original diagnosis refers to immature fruits of 2 articles which have not yet separated.

**13b. var. *insularis* Markgr., n. var.**

Fruticulus scandens. Folia decussata vel ternato-verticillata, glabra, subcoriacea, petiolus 5—7 mm longus, lamina late elliptica, 5—8 × 3—4 cm, brevissime et obtuse acuminata, interdum obtusa; nervi laterales distincti, 3 mm inter se distantes. Inflorescentiae axillares, uninodes, laxe pubescentes, pedunculus 5—10 mm longus. Lobi calycis ovati, laxe pubescentes, 1.5 × 0.7 mm. Corollae albidae tubus 5.5—6 mm longus, extus glaber, lobi breviter ovati, 1.8 × 1.5 mm, glabri. Antherae breviter ovoides, 0.7 mm longi. Caput stigmatis globosum, breviter biapiculatum. Ovarium globosum, 0.6 mm altum, laxe setosum. Mericarpia uniarticulata, articuli ellipsoidei, obtusi, atronitentes, usque ad 15 × 8 mm. Semen ruminatum, 13 × 7 mm.

**Type:** *Seimund* s.n., Pulau Lalang (sub '*A. lucida*') (SING).

MALAY PENINSULA. P e r a k. *Seimund* s.n., Pulau Lalang. — D i n d i n g s. Ridley 7177, Bruas. — J o h o r e. FRI 5140, Mersing, Telok Gorek, Arang Forest Reserve. — M a l a c c a. *Seimund* s.n., Pulau Rumbia; KEP 71048, Pulau Jarak.

**13c. var. *pumila* (Hook. f.) Markgr., n. stat.**

*A. pumila* Hook. f., Fl. Br. Ind. 3 (1882) 635; King & Gamble, Mat. Fl. Mal. Pen. (1907) 420; Ridl., Fl. Mal. Pen. 2 (1923) 333; Kerr in Craib, Fl. Siam. En. 2, 5 (1939) 432; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166. — *Gynopogon pumilus* K. Schum., E. & P. Nat. Pfl. Fam. 4, 2 (1895) 151.

Slender liana. *Leaves* (2—)3(—4)-whorled, well coriaceous, glabrous, narrowly elliptic on slender often lateral branches, broader so on stouter ones, 2.5—5 × 0.7—2 cm, lateral nerves indistinct, subhorizontal, petiole 3—4 mm long. *Inflorescences* axillary, few-flowered, one-noded, puberulous, peduncle 1—2 mm long. *Calyx* lobes ovate-acute, 2 mm long, puberulous. *Corolla* tube 5 mm long, glabrous without, lobes ovate-orbicular, 1.8—2 mm long. *Anthers* 1 mm long, inserted below the mouth. *Ovary* globose, 0.5 mm, setose. *Mericarps* mostly crowded in the leaf axils, each with 1 article of 10 × 7 × 7 mm. Cotyledon of the embryo oblong, flat, 2.2 mm long, narrow, radicle 1.4 mm long.

MALAY PENINSULA. P u k e t (border with Thailand). — K e d a h. Ridley 5504, Stone 8530, Ding Hou 787, G. Jerai; Kerr 21744, Langkawi, Kwah, 200 m. — P a h a n g. Burkill 2423, 8566, Fraser's Hill. — M a l a c c a. Lobb s.n., Mt. Ophir (type); Ridley 3193, G. Sedang; Ridley 10094, Padang Batu Ophir.

**13d. var. *obovatula* Markgr., n. var.**

Frutex scandens. *Folia* terna, obovata, glabra, coriacea, basi cuneata, 4—7 × 1.5—2 cm, nervi laterales indistincti, 2 mm inter se distantes, angulo 60° e nervo mediano oriundi. Petiolus 5—7 mm longus. *Inflorescentiae* axillares, breves (1 cm), uninodes, pedunculus 2—4 mm longus. *Calycis* puberuli lobi ovato-lanceolati, 1.2 mm longi. *Corollae* albidae tubus 5—6 mm longus, lobi oblique ovati, 1.4 × 1.2 mm. *Antherae* breviter ovatae, 0.7 mm longae. *Ovarium* 0.5 mm altum, globosum, dense setulosum. Caput stigmatibus anguste cylindricum, breviter apiculatum, antheras attingens. *Mericarpi* uniarticulata, articuli oblongo-ellipsoidei, subacuminati, 15 × 7 × 7 mm. Embryonis cotyledones oblongi, 6 mm, radicula 3 mm longa.

T y p e: Ashton 71 (S).

BORNEO. S a r a w a k. S 19591, Ulu Kenyana, Mukah, prim. mixed Dipterocarp forest. — B r u n e i. Ashton 71, Berakas For. Res., on kerangas. — S a b a h. BS 197; SAN 54359, Kitabu For. Res., 900 m, Dist. Kudat; Shah & Kadim 949, Jesselton, Pulau Gaya.

**13e. var. *reinwardtii***

*A. reinwardtii* Bl., Cat. (1823) 43, s.str.; Boerl., Handl. 2 (1907) 393; Merr., Contr. Arn. Arb. 8 (1934) 144; Kerr, Fl. Siam. En. 2 (1939) 432, p.p.; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 165; Back. & Bakhf., Fl. Java 2 (1965) 230. — *A. aromatica* Reinw. ex Bl., Cat. (1823) 43. — *Gynopogon reinwardtii* (Bl.) Koord., Exk. Fl. Java 3 (1912) 74.

Slender liana. *Leaves* 3- to 4-whorled, coriaceous, glabrous, lanceolate, 6—10 × 2—3.5 cm, base cuneate, lateral nerves 2 mm distant, rising at 80° from the midrib; petiole 6—8 mm. *Inflorescences* 2-noded, peduncle 8—12 mm, pubescent, thyrsoid, few-flowered, pedicels 4 mm. *Calyx* lobes ovate-acute, pubescent and ciliate, 1.5 mm long. *Corolla* tube glabrous outside, 7—8 mm long, lobes ovate, 1.5—2 mm long. *Anthers* 1.2 mm long, inserted at the mouth. *Ovary* globose, 1 mm high, setose. Stigma head with short obtuse tips. *Mericarps* with one ellipsoidal obtuse article, 15 × 9 × 9 mm.

T y p e: '*Reinwardtia aromatica* Bl.' (in L).

D i s t r i b u t i o n: Numerous collections. Malay Peninsula (Pahang, Johore), Sumatra (also Simalur, Banka), Borneo (Sarawak, Sabah), Java.

**Note:** This subspecies has short flowers like var. *lucida*, but lanceolate leaves like var. *meiantha*; its fruit articles are longer than in these two. All three varieties inhabit nearly the same area and are all frequent. They may have differentiated from the same gene pool.

**13f. var. *lucida* (Wall.) Markgr., n. stat.**

*A. lucida* Wall. in Roxb., Fl. Ind. ed. Carey 2 (1824) 540; Hook.f., Fl. Br. Ind. 3 (1882) 635; Ridl., J. Str. Br. R. As. Soc. 33 (1900) 109; King & Gamble, Mat. Fl. Mal. Pen. (1907) 417; Ridl., J. Str. Br. R. As. Soc. 59 (1911) 129; Merr., En. Born. (1921) 499; Merr., En. Philip. 3 (1923) 328; Ridl., Fl. Mal. Pen. 2 (1923) 332; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166; Henderson, Mal. Wild Fl. 1 (1959) 279, fig. 261; Backer & Bakh.f., Fl. Java 2 (1965) 230. — *A. stellata* auct. non R. & Sch.: DC., Prodr. 8 (1844) 346; Miq., Fl. Ind. Bat. 2 (1856) 407, p.p.; Boerl., Handl. 2 (1899) 393. — *A. quinata* Miq., Fl. Ind. Bat. 2 (1856) 407; Miq., Sum. (1860) 228 (cf. Stapf in Trans. Linn. Soc. Bot. 4 (1894) 207). — *A. odorata* auct. non Wall.: King & Gamble, Mat. Fl. Mal. Pen. (1907) 416; Merr., En. Born. (1921) 499 (cf. Ridl., Fl. Mal. Pen. 2 (1923) 334). — *A. reinwardtii* auct. non Bl.: Kerr, Fl. Siam. En. 2 (1939) 432.

Slender liana. *Leaves* 2- to 4-whorled, coriaceous, glabrous, elliptic to obovate, obtuse or short-acuminate, base sinuately rounded, 4—7 × 2—3 cm, lateral nerves 2 mm distant, rising at 80—70° from the midrib; petiole 2—5 mm. *Inflorescences* 1- to 2-noded, few-flowered, thyrsoid, glabrous or puberulous, peduncle 5 mm, pedicels 2—3 mm. *Calyx* lobes ovate, acutish, 2 mm long, ciliate, pubescent on the keel. *Corolla* tube glabrous outside, 7 mm, lobes ovate, 3 × 2 mm. *Anthers* 1 mm long, inserted at the mouth. *Ovary* globose, 0.5 mm high, setose. Stigma head with short obtuse tips. *Mericarps* with 1—2 ellipsoidal obtuse articles, 12 × 8 × 8 mm.

**Distribution:** Numerous collections. Thailand; Malay Peninsula (Langkawi, Penang, Perak, Dindings, Pankore, Pahang, Selangor, Malacca, Johore, Singapore), Sumatra (Sibolga), Banka, Java, Tambelan Is.(Ste. Barbe), Borneo (Sarawak, Brunei, Sabah), Philippines (Culion), SW. Celebes.

**Note:** Kerr, Fl. Siam. En. 2 (1939) 433, remarked that the type specimen of *A. lucida* Wall. has 'nearly mature' flower buds of 4 mm. This is true, but it is scarcely possible to decide whether a flower bud is mature. At any rate, the obtusish leaves and the small congested fruit articles of the type specimen afford another good character of this taxon, and such plants, even from the classical locality (Singapore), if with open flowers, possess a corolla tube of 7—8 mm.

**13g. var. *meiantha* (Stapf) Markgr., n. comb.**

*A. lucida* Wall. var. *meiantha* Stapf, Trans. Linn. Soc. Bot. 4 (1894) 207; Merr., En. Born. (1921) 499; Sarawak Mus. J. 3 (1928) 547. — *A. forbesii* King & Gamble, Mat. Fl. Mal. Pen. (1907) 420; Ridl., Fl. Mal. Pen. 2 (1923) 332; Burkill & Hend., Gard. Bull. Str. Settl. 3 (1925) 396; Merr., Contr. Arn. Arb. 8 (1934) 144; Tsiang, Sunyatsenia 3 (1936) 136; Kerr, Fl. Siam. En. 2 (1939) 431; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166; Back. & Bakh.f., Fl. Java 2 (1965) 230. — *A. stellata* auct. non R. & Sch.: Miq., Fl. Ind. Bat. 2 (1856) 407, p.p.; Koord., Minah. (1898) 528.

Slender liana. *Leaves* decussate or 3- to 4-whorled, coriaceous, glabrous, broad-lanceolate, 6—12 × 3—4 cm, base cuneate, lateral nerves 2 mm distant, rising at 80° from the midrib; petiole 4—8 mm. *Inflorescences* 1- to 2-noded, pubescent, thyrsoid, few-flowered, peduncle 10—15 mm, pedicels 2.5—4 mm. *Calyx* lobes ovate-acute, puberulous, 1.5 × 1 mm. *Corolla* tube glabrous outside, 10 mm, lobes ovate, 5 mm long. *Anthers* 1.2 mm long, inserted at the mouth. *Ovary* globose, 0.5 mm high, setose. Stigma head with short obtuse tips. *Mericarps* with 1—2 ellipsoidal obtuse articles, 10—12 × 8 × 8 mm.

**Type:** King's coll. 2124, Larut (K); cf. Kerr, Fl. Siam. En. 2 (1939) 431.

**Distribution.** Numerous collections. Yunnan (Tsiang l.c.), Thailand (Kerr l.c.), Malay Peninsula (Kedah, Trengganu, Perak, Pahang, Selangor, Negri Sembilan, Johore, Singapore); Sumatra; Borneo (Sarawak, Sabah).

#### Series 2. ALYXIA

Frutices scandentes vel subscandentes. *Folia* coriacea, 2- ad 4-verticillata, mediocria, obtusa vel ex obtuso breviter acuminata, elliptico-ovata, nervis lateralibus numerosis, 2—3 mm inter se distantibus, indistinctis. *Inflorescentiae* 2- ad 3-nodes, contractae, breves, graciles, pedunculi 5—10 mm longi. Flores sessiles. *Corollae* tubus 2—3 mm longus. *Ovarium* setosum. *Articuli fructuum* 1—4 in quoque mericarpio, subglobosi,  $10 \times 9 \times 9$ — $12 \times 11 \times 11$  mm.

Type of the series and of the genus: *Alyxia spicata* R.Br.

**Distribution:** 2 species, rather frequent in the lowland rain forest of New Guinea and northern Australia.

#### KEY TO THE SPECIES OF SERIES 2. ALYXIA

1. Leaves often short-acuminate. Inflorescences subglabrous or glabrous. Corolla tube outside pilose near the mouth, lobes shortly ovate,  $1.8 \times 1.3$  mm. Fruit articles  $12 \times 11 \times 11$  mm . . . . . **14. *A. acuminata***
1. Leaves obtuse or obtusely acute. Inflorescences white-papillate to puberulous. Corolla tube glabrous outside, lobes oblong-ovate,  $2.3 \times 0.8$  mm. Fruit articles  $10 \times 9 \times 9$  mm. . . . . **15. *A. spicata***

#### 14. *Alyxia acuminata* K. Sch.

*A. acuminata* K. Sch. in K. Sch. & Hollr., Fl. Kais. Wilh. Land (1889) 110; Boerl., Handl. 2, 2 (1899) 393; Markgr., Nova Guinea 14 (1926) 279; Bot. Jahrb. 61 (1928) 181; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 165. — *Gynopogon acuminatus* K. Sch., E. & P. Nat. Pfl. Fam. 4, 2 (1895) 151. — *A. acuminata* var. *montana* Markgr., Bot. Jahrb. 61 (1928) 182.

Liana. Leaves 2- to 4-whorled, subcoriaceous, glabrous, elliptic, short-acuminate, base sinuately narrowed,  $6-8(-11) \times 2-4.5(-5)$  cm, lateral nerves indistinct, petiole 5—10 mm long. Inflorescences thyrsoid, 2- to 3-noded, slender, white-papillate, few-flowered, peduncle 1 cm long. Calyx lobes ovate-acute, 1.2 mm long, ciliate, pubescent at the tip. Corolla tube 3 mm long, pilose outside near the mouth, lobes ovate, 2 mm long, pubescent inside. Anthers 1 mm long. Ovary 0.5 mm high, densely setose. Mericarps with 1 article, this  $12 \times 11 \times 11$  mm.

Lectotype: Gjellerup 975, Humboldt Bay.

Distribution: New Guinea to the Solomon Islands.

NEW GUINEA. West. Jayapura Dist.: van Royen & Sleumer 6488, Hollandia, Cape Tanah Merah, 100 m; BW 4182, Hollandia, Hamadi; Gjellerup 975, 986, Humboldtbaai, 20—50 m. — East. Morobe Dist.: Brass 29217, Oomsis (near Lae). — Central Dist.: Pullen 6786, Heyligers 1376, 15—16 miles N. of Port Moresby. — New Britain. NGF 26741, Talasea, 10 miles S. of Cape Ruge,  $5^{\circ}35' S$   $147^{\circ}24' E$ , 180 m. — D'Entrecasteau Is. Normanby I. (=Duaui): Brass 25709, Mt. Pabinama, 750 m. — Louisiade Is. Sudest I.: Brass 28006, Mt. Riu, 500 m.

**Ecology:** Common in lowland rain forest at low altitudes, penetrating even into brackwater swamps.

**15. *Alyxia spicata* R.Br.**

*A. spicata* R.Br., Prodr. Fl. N. Holl. 1 (1810) 470; DC., Prodr. 8 (1844) 346; F.v.M., Fragm. 6 (1867) 117; Benth., Fl. Austr. 4 (1869) 308; F.v.M., Descr. Not. 1 (1875) 28; Syst. Cens. (1882) 93; 2d. ed. (1889) 156; Bailey, Austr. Ass. Adv. Sc. (1898) 15; Queensl. Fl. 3 (1900) 979; Compr. Cat. Q. Pl. (1909) 317; Moore, J. Bot. 64 (1926) 95; Markgr., Bot. Jahrb. 61 (1928) 185; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 165.

Sarmentose shrub. *Leaves* decussate or 3-whorled, subcoriaceous, glabrous, ovate-oblong, obtusely acute, (3.5—)5—9 × 2—2.5 cm, base cuneate, lateral nerves indistinct, petiole 5—7 mm. *Inflorescences* thyrsoid, rather slender, white-papillate to puberulous, 2- to 3-noded, few-flowered, peduncle 6 mm long. *Flowers* sessile. *Calyx* lobes ovate-acuminate, pubescent, 2 mm long. *Corolla* tube 2 mm long, glabrous outside, lobes ovate-oblong, 2 mm long. *Anthers* 0.7 mm long. *Ovary* globular, 0.6 mm high, setose in the upper 2/3. *Mericarps* with 1—2 articles, 10 × 9 × 9 mm.

**Distribution:** Queensland (islands in the Gulf of Carpentaria) and New Guinea.

**NEW GUINEA.** East. Western Dist.: NGF 33544, Bensbach sub-dist., Weam, 30 m, 8°38' S, 141°7' E; Brass 6528, Mabaduan; 8488, Tarara, Wassi Kussa R.

**Series 3. LAURINAE Markgr., n. ser.**

*Folia* obtusa, ± lanceolata, nervis lateralibus obsoletis. *Inflorescentiae* depauperatae, plerumque uninodes, tri- ad uniflorae. *Tubus corollae* 8 mm, extus glaber. *Antherae* longiores quam 1 mm. *Mericarpi* plerumque uni-articulata, articuli breviores quam 10 mm, globoso-ellipsoidei vel globosi.

**Type:** *Alyxia laurina* Gaudichaud.

**Distribution:** 2 species in the Philippines, 1 in Waigiu Island.

**KEY TO THE SPECIES OF SERIES 3. LAURINAE**

1. Leaves 2—5(—7) × 1—2(—2.5) cm. Calyx lobes 1.5 mm long, pubescent. Fruit articles about 10 × 8 × 8 mm.
  2. Leaves broad-lanceolate or oblanceolate, obtuse. Inflorescences hirtellous. Ovary short-pilose. . . . . **16. *A. laurina***
  2. Leaves lanceolate-elliptic to elliptic, acuminate. Inflorescences finely pubescent. Ovary long-pilose . . . . . **17. *A. luzoniensis***
1. Leaves smaller, lanceolate, obtuse, 1—2.5 × 0.5—1 cm. Calyx lobes 2.5 mm long, long pilose. Fruit articles globular, 6 mm diam. . . . . **18. *A. parvifolia***

**16. *Alyxia laurina* Gaud.**

*A. laurina* Gaud., Voy. Uranie, Bot. (1826) 451, tab. 62; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166. — *Gynopogon laurinus* K. Sch., E. & P. Nat. Pfl. Fam. 4, 2 (1895) 151.

Liana. *Branches* angular. *Leaves* 2- to 3-whorled, coriaceous, glabrous, broad-lanceolate or oblanceolate, obtuse or slightly retuse, base cuneate, 2.5—5(—7) × 0.9—1.5(—2.5) cm, lateral nerves obsolete, petiole 2 mm long. *Inflorescence* axillary, with 1, rarely 2 nodes, few-flowered, often only 1- to 3-flowered, hirtellous, peduncle 3 mm long. *Calyx* lobes ovate, acutish, 1.5 mm long, pubescent. *Corolla* tube 8 mm long, glabrous outside, lobes

ovate,  $2 \times 1.5$  mm. *Anthers* 1.2 mm long, inserted at the mouth. *Ovary* globose, 1 mm high, setose in the upper part. *Mericaip* with 1—2 elliptic-globular articles,  $0.9 \times 0.7 \times 0.7$  cm.

NEW GUINEA. West. Waigiu I. region, Rauki (= Rawak) I., rather abundant, *Van Royen* 5354 (L) (*locus classicus* of Gaudichaud!); Tobie I. (N. of Waigiu), cf. Benthams in Hook., Lond. J. Bot. 2 (1843) 226; Waigiu I., near Waifo, east bank of Majalibit Bay, xerophytic vegetation, rather abundant, *Van Royen* 5233a (L).

### 17. *Alyxia luzoniensis* Merr.

*A. luzoniensis* Merr., Philip. J. Sc. 4 (1909) Bot. 313; Merr., En. Philip. 3 (1923) 328; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Liana. *Leaves* 2- to 4-whorled, coriaceous, glabrous, lanceolate-elliptic to elliptic, acuminate, base cuneate,  $2-5 \times 1-2$  cm, lateral nerves obsolete, petiole 1—2 mm long. *Inflorescences* axillary, 1-, rarely 2-noded, few-flowered, peduncle 1 cm long, axis finely pubescent. *Calyx* lobes ovate, acutish, 1.5 mm long, pubescent. *Corolla* tube 7 mm long, lobes  $2.2 \times 1.5$  mm. *Anthers* 1.4 mm long, inserted at the mouth. *Ovary* globose, 0.7 mm high, setose. *Mericaips* with 1—2 elliptic-globular articles,  $1 \times 0.8 \times 0.8$  cm.

PHILIPPINES. Luzon: Ilocos Norte Prov., BS 32698; Zambales Prov., BS 5107; Camarines Sur Prov., Mt. Madooy, BS 76053; Benguet Subprov., BS 40324, Mt. Baudan; BS 31918, Pauai; Bontoc Subprov., BS 532.

### 18. *Alyxia parvifolia* Merr.

*A. parvifolia* Merr., Philip. J. Sc. 4 (1909) Bot. 313; Merr., En. Philip. 3 (1923) 328; Pich., Mém. Mus. Hist. Nat. n.s. 27 (1948) 166.

Slender liana. *Leaves* 3- to 5-whorled, coriaceous, glabrous, lanceolate, obtuse, base rounded,  $1-2.5 \times 0.5-1$  cm, lateral nerves indistinct, petiole 2—3 mm long. *Inflorescences* axillary, few-flowered, peduncle almost none, flowers often solitary or 2 in a leaf axil, bracts condensed on the very short pedicel. *Calyx* lobes 2.5 mm long, pilose, oblong-ovate. *Corolla* tube 8 mm, glabrous outside, lobes ovate, 4 mm. *Anthers* 1.5 mm long, inserted slightly below the mouth. *Ovary* globose, 1 mm high, setose. *Mericaip* with 1 globular article, 6 mm diam.

PHILIPPINES. Luzon. Benguet Prov.: Elmer 8599, Baguio; BS 8339, PNH 7571, Pauai, 2100 m; BS 5468, Mt. Tonglon; BS 40323, BS 846, Mt. Baudan; Elmer 5800, Mt. St. Thomas. — Mountain Prov.: PNH 7566, Mt. Pauai; Jacobs 7149, Mt. Pulog,  $16^{\circ}36' N 120^{\circ}54' E$ , 2350—2450 m.

### Series 4. GLOBULIFERAE Markgr., n. ser.

Frutices scandentes. *Folia* 3- ad 4-verticillata, mediocria, elliptica, nervi laterales 2 mm inter se distantes. *Inflorescentiae* 2- ad 3-nodes, pedunculus 1—10 mm longus. *Corollae* tubus 8 mm longus. *Ovarium* globosum, 1.5 mm altum, leviter setosum. *Mericaipia* monili-formia, articuli 4 in quoque mericaipio, globosi, 6 mm diam.

Type: *Alyxia concatenata* (Blco.) Merr.

Distribution: Philippines and New Guinea, 1 species; probably about 10 other related species in New Caledonia.



**19. *Alyxia concatenata* (Blanco) Merr.**

*A. concatenata* (Blanco) Merr., Sp. Blanc. (1918) 310; Merr., En. Philip. 3 (1923) 327; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166. — *Brabejum concatenatum* Blanco, Fl. Filip. ed. 2 (1845) 40. — *A. stellata* F.-Vill., Nov. App. (1880) 129, non Forst. — *A. monilifera* Vidal, Rev. Pl. Vasc. Philip. (1886) 182. — *Gynopogon monilifera* Merr., Philip. Gov. Lab. Publ. 29 (1905) 46.

**Liana.** *Leaves* 3- to 4-whorled, coriaceous, glabrous, elliptic or lanceolate-elliptic, obtusely acuminate at the tip, gradually narrowed at the base but not cuneate, 5—11 × 1.8—4 cm, lateral nerves 2 mm distant, petiole 8—10 mm. *Inflorescences* thyrsoid with 2—3 nodes, pubescent, peduncle 1—10 mm, branches thyrsoid or simple, all ending in dichasia. *Calyx* lobes ovate, 2.5 mm long, ± pubescent. *Corolla* tube 8 mm, glabrous outside, lobes ovate, 3 × 1.5 mm, puberulous above. *Anthers* 1.2 mm long, inserted at the mouth. *Ovary* globular, 1.5 mm high, setose in the upper part. *Mericarps* moniliform, as a rule of 4 articles, each article globular, 6 mm diam.

**PHILIPPINES.** Numerous collections. Luzon, Mindoro, Samar, Panay, Leyte, Negros, Cebu, Bohol, Palawan, Camiguin de Misamis, Mindanao, Biliran.

**NEW GUINEA.** **P a p u a:** *Jacobs* 9381, Mt. Bosavi, N. side, ± 6° 26' S 142° 50' E, on old well-drained volcanic soil, in mixed primary forest, liana 20—25 m, fixing itself in trees by its patent branches, although the main stem shows a twist, fr. yellow, eventually black (ripening from top to base).

**E c o l o g y:** Chiefly on ridges in mossy forest, 700—2400 m (cf. Merrill).

series 5. MEGALOCARPAE Markgr., *n. ser.*

*Folia* 2- ad 5-verticillata, coriacea, e maioribus (10—15 cm longa), plerumque subtus puberula. *Inflorescentiae* puberulae, uninodes, satis multiflorae. *Calycis lobi* acuti. *Tubus corollae* 8—9 mm. *Ovarium* dense setosum. *Articuli fructuum* acuminati, longi, 20—25 × 10—15 mm, stipes mericarpium usque ad 15 mm longus.

**T y p e:** *Alyxia scortechinii* King & Gamble.

**D i s t r i b u t i o n:** 2 species in Sumatra and the Malay Peninsula.

KEY TO THE SPECIES OF SERIES 5. MEGALOCARPAE

1. Leaves lanceolate, long-acuminate, base long-narrowed, 10—12 × 2 cm. Peduncle 1—3 cm; flowers loose, numerous. . . . . **20. *A. atjehensis***
1. Leaves elliptic, short-acuminate, sinuately narrowed at the base, 10—15 × 4—6 cm. Peduncle 0—8 mm; flowers contracted, not numerous. . . . . **21. *A. scortechinii***

**20. *Alyxia atjehensis* Markgr., *n. sp.***

**Frutex scandens.** *Folia* ternatim verticillata, coriacea, glabra, lanceolata, utrimque longe acuminata, 10—12 × 2 cm, raro minora, petiolo 6—8 mm longo suffulta. *Nervi laterales* subhorizontales, numerosissimi, supra et subtus distincti (in sicco), 1—2 mm inter se distantes. *Inflorescentiae* axillares, multiflorae, subcorymbosae, pubescentes, 1- ad 2-nodes, pedunculus 1—5 cm longus, bracteae 1—2.5 mm longae; ramuli in quoque nono 3; pedicelli 3 mm longi. *Lobi calycis* ovato-lanceolati, hispiduli, 2 × 1.2 mm. *Corollae tubus* extus glaber, 9 mm longus, lobi oblique ovati, 3 × 2.3 mm. *Antherae* 0.7 mm longae, infra faucem insertae. *Ovarium* globosum, 0.7 mm altum, dense setosum. Caput stigmatibus breve, glabrum. *Mericalpia* uniarticulata, articuli ellipsoidei, acuminati, 20—23 × 10—12

mm. Semen nigrum, transverse ruminatum,  $20 \times 8$  mm. Embryonis cotyledones oblongo-lanceolati, petiolati, lamina  $3.5 \times 1.5$  mm, petioli 2 mm longi, radícula 2 mm longa.

**Type:** *Yates 2005* (B), Sumatra, Brastagi.

**SUMATRA.** *Forbes 1863*. — **North Sumatra:** *Yates 2005*, Brastagi, 1350 m; *Lörzing 6125*, Sibolangit, SSE. of Mt. Sibajak, 1500 m; *Hamel 713*, Karoland, Deleng Piso Piso. — **Atjeh:** *Van Steenis 5942*, above Takengon, 1275 m; *De Wilde 14055*, G. Ketambe, 40 km NW. of Kutatjane, 1700—1850 m; *De Wilde 13312*, 13354, G. Bandahara, 25 km NNW. of Kutatjane, 1800 m, S. of the summit; *Van Steenis 8955*, Gaju & Alas Lands, Mt. Goh Lembuh, 1000 m.

**Ecology:** Montane rain forest, mossy forest.

## 21. *Alyxia scortechinii* King & Gamble.

*A. scortechinii* King & Gamble, Mat. Fl. Mal. Pen. 19 (1907) 421; Ridl., Fl. Mal. Pen. 2 (1923) 334; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166. — *A. selangorica* King & Gamble, Mat. Fl. Mal. Pen. 19 (1907) 422; Ridl., Fl. Mal. Pen. 2 (1923) 334; Henderson, J. Mal. Br. R. As. Soc. 17 (1939) 56; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 165. — *A. triptera* Merr., Pap. Mich. Ac Sc. 24 (1939) 88; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Liana. Leaves decussate or 3- to 5-whorled, coriaceous, oblong-elliptic or oblong-obovate, short-acuminate, base sinuately narrowed, puberulous below, glabrescent, (7.5—)10—15  $\times$  (2—)4—6 cm; lateral nerves numerous, rather distinct, 2—3 mm distant, subhorizontal; petiole 7—12 mm. Inflorescences one-noded, dichasial, pubescent, sessile. Calyx lobes ovate-lanceolate, acute, ciliate, 2—2.5 mm long. Corolla tube 8—10 mm, pubescent outside near the mouth, lobes obtrusish,  $4 \times 1.5$  mm. Anthers 1.4 mm. Ovary globular, 0.7 mm high, long-setose in the upper 2/3. Mericarps with 1(—2) ellipsoidal, short-acuminate articles, 20—25  $\times$  12—15  $\times$  12—15 mm.

**MALAY PENINSULA.** **Perak:** *Scortechini s.n.* (type); *Ridley 2895*, Kwa Kangsa. — **Pahang:** *Ridley s.n.*, Telom; *Batten Pooll s.n.*, Cameron Highlands. — **Selangor:** *Ridley 8558*, Gua Batu.

**SUMATRA.** **Atjeh, Gajo Lands:** *De Wilde 13687*, G. Ketambe, 40 km NW. of Kutatjane, 1700 m. — **East coast:** *Rahmat si Boeea 8619*, Asahan, Adian Rindang, near Huta Tomuan Delok. — **West coast:** Mt. Kerintji, *Meijer 6329*, 7273, *Alston 14192*, *Jacobs 4497*, 1500—2000 m; *Meijer 5530*, Mt. Sago, Pajakumbuh, 1300 m; *Beccari 333*, 364, Mt. Singalang. — **Palembang:** *Forbes 2312*, Bigin Telok, Rawas. — **Simalur:** *Achmad 1746*, Tapah, Defajan. — **Mentawai Is.:** *Boden Kloss 14089*, Siberut.

## Series 6. FLORIBUNDAE Markgr., n. ser.

Frutices scandentes plerique fortes. Folia coriacea, saepe 4- ad 5-verticillata, multinervia, elliptica vel obovata, saepe obtusa, maiuscula. Inflorescentiae plerumque multiflorae, laxae, 2- ad 5-nodes, pedunculi plerumque longi. Corollae tubus 2—4 mm longus. Articuli fructuum 1—2 in mericarpio, e maioribus generis, maximi 35 mm longi. Cotyledones embryonis in marginibus undulato-dentati.

**Type:** *Alyxia maluensis* Markgr.

**Distribution:** 7 species, centering in New Guinea, 2 of them extending to the Bismarck Archipelago and to the Solomon Is.

**Notes:** According to descriptions and figures, species with extra-ordinary large fruit articles, hitherto known only from this series, are found also on the mainland, but whether they belong to this series remains open for further investigation. Such species are: *A. siamensis* Craib in Thailand, *A. balansae* Pit. and *poilanei* Pit. in Indochina, and *A. villilimba* Wu and *A. yunkuniana* Tsiang & Li in China.

## KEY TO THE SPECIES OF SERIES 6. FLORIBUNDAE

1. Leaves broad, more than half as broad as long, mostly obtuse, thickly coriaceous, 12—18 × 5.5—8 cm.
2. Leaves elliptic. Calyx lobes narrow, 2.5 × 1 mm. Corolla tube pubescent, 2.5 mm long. Fruit articles ellipsoidal, 20—24 × 12—14 × 12—14 mm. **22. *A. maluensis***
2. Leaves obovate. Calyx lobes broader, 3 × 1.5 mm. Corolla tube glabrous outside, 4 mm long. Fruit articles subglobular, 15—20 × 12—15 mm. **23. *A. tetraquetra***
1. Leaves less than half as broad as long, coriaceous or subcoriaceous, usually short- or long-acuminate, rarely some leaves obtuse.
3. Leaves 8—10 mm acuminate. Inflorescences shorter than 2 cm. Calyx lobes not longer than 1 mm.
4. Leaves coriaceous, with cuneate base, oblong, 6—13 × 2—4 cm, lateral nerves 1—2 mm distant. Corolla tube pilose outside. Fruit article 20 × 13 × 13 mm. **24. *A. clemensiae***
4. Leaves subcoriaceous, with rounded base and rostrate tip, 10—15 × 5—6 cm. Lateral nerves 0.5 mm distant. Corolla tube glabrous. Fruit article 17 × 12 mm. **25. *A. multistriata***
3. Leaves short-acuminate (2—5 mm), or acute. Inflorescences 3—13 cm. Calyx lobes 1.5—3.5 mm long.
5. Leaves ± elliptic, distinctly acuminate, relatively long, 8—14 × 3—5 cm. Peduncle 20—40 mm. Corolla tube 3 mm long. Fruit articles distinctly ellipsoidal.
6. Leaves elliptic. Inflorescence glabrous, large, peduncle 4 cm. Calyx puberulous, cup-shaped, cup 1.5 mm, lobes 1.5 mm long. Corolla tube glabrous outside. Mature fruit not known. . . . . **26. *A. floribunda***
6. Leaves obovate-elliptic. Inflorescence hirtellous, peduncle 1—2 cm long (flowers unknown in *A. kabaenae*). Calyx hirsute, deeply split, cup 0.5 mm, lobes 1.5 mm long. Corolla tube fine-pilose outside. Fruit articles 25—35 mm long.
7. Lateral leaf nerves 1 mm spaced, blade short-acuminate. Fruit articles 35 × 20 × 20 mm. . . . . **27. *A. scabrida***
7. Lateral leaf nerves 2—3 mm spaced, blade not acuminate, obtuse or acute. Fruit articles 25 × 16 × 16 mm. . . . . **28. *A. kabaenae***
5. Leaves obovate, obtuse or shortly and obtusely acuminate, 5—9 × 2.5—4.5 cm (relatively short). Peduncle up to 70 mm long. Corolla tube 4 mm long. Fruit articles subglobular, 16 × 13 × 13 mm. . . . . **29. *A. fragrans***

**22. *Alyxia maluensis* Markgr.**

*A. maluensis* Markgr., Bot. Jahrb. 61 (1928) 185; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

A stout liana. Branches angular. Leaves 4- to 5-whorled, coriaceous, glabrous, broad-elliptic, short-acuminate or subobtuse, base sinuously narrowed, generally 12 × 5.5 cm, lateral nerves numerous, not very distinct, 2 mm distant; petiole stout, 15 mm long. Inflorescence contracted, thyrsoid with 2—3 nodes, nodes with di- or trichasia, peduncle stout, 1—3 cm long. Bracts and short pedicels pubescent. Calyx lobes ovate, obtuse, hirsute-pubescent, 2.5 × 1 mm. Corolla tube puberulous outside, 2.5 mm long, lobes ovate, 1 × 0.5 mm, pubescent outside and inside. Anthers 0.5 mm long. Ovary ovate, densely pilose, 0.7 mm high. Mericarps with 1—2 articles, 20—24 × 12—14 mm.

Distribution: New Guinea and adjacent islands, Solomon Is.

ARU IS. K o b r o ö r I.: *Buwalda* 5241, Selibatabata. — W o k a m I.: *Buwalda* 4938, Dosinamalau. NEW GUINEA. West. Jayapura Dist.: *Brass* 12905, 13715, Idenburg R., Bernhard Camp, 850 m. — East. Sepik Dist.: *Hoogland & Craven* 10422, near Wagu; *Ledermann* 6942, Hauptlager Malu, Alluvialwald am Sepik, 20—40 m (type). — Western Highlands Dist.: *NGF* 42022, Kapiago, Paga Hill Rd., 1300 m, 5°22' S 142°33' E; *NGF* 14297, Wabag-Laiagam Rd., 2400 m, 5°25' S 143°25' E. — Madang Dist.: *NGF* 46537, Gogol R., 5°10' S 145°25' E. — Morobe Dist.: *Clemens* 41832, Boana, 750—1350 m; *LAE* 51687, Buso village, 30 m, 6°40' S 147°10' E; *Clemens* 2118, Quembung, 600 m; *Clemens* 1094, 1718, Sattelberg, 900 m; *LAE* 53890, Angabena Ridge, 1675 m, 7°20' S 146°10' E; *NGF* 18072, Kui; *NGF* 22891, island near Kui, 7°30' S 147°15' E; *NGF* 44319, Lasanga I. near Kui. — Central Dist.: *Carr* 13331, Boridi; *NGF* 41913, Cape Rodney. — Milne Bay Dist.: *NGF* 46912, Rabaraba, road to Mt. Suckling, 9°37' S 149°10' E. — Woodlark I. *Brass* 28742, Kulumadau.

### 23. *Alyxia tetraquetra* Markgr.

*A. tetraquetra* Markgr., Bot. Jahrb. 61 (1928) 185; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Stout liana. Branches angulate. Leaves 3- to 4-whorled, thickly coriaceous, glabrous, slightly obovate-elliptic, obtuse, (7—)12—18 × (4—)6—8 cm; petiole stout, 1 cm. Inflorescence thyrsoid, with 3 nodes, many-flowered, puberulous, peduncle stout, 1.5—2.5 cm. Calyx lobes ovate, obtuse, 4 × 2 mm, pubescent. Corolla tube 4 mm long, glabrous outside, lobes suborbicular, 1 mm, pubescent. Anthers 0.7 mm long, inserted at the mouth. Ovary 0.5 mm high, shortly pilose. Mericarps with 1—2 sub-globular articles, 1.5—2 × 1.2—1.5 × 1.2—1.5 cm. Cotyledons of the embryo oblong, 4 × 3 mm, with undulate-dentate margins, radicle 3 × 1.5 mm.

NEW GUINEA. West. Jayapura Dist.: *Kostermans & Soegeng* 41, 51, Sukarnopura. — Snow Mts.: *NFN* 33162, Okwalimkan, 1200 m, 5°02' S 140°55' E. — East. Sepik Dist.: *Ledermann* 12837, Felsspitze, 4°10' S 141°30' E; *Ledermann* 8722, April R., Standlager, 40—100 m. — Western Highlands Dist.: *NGF* 37353, 4 miles N. of Kapiago on Koroba Rd.

### 24. *Alyxia clemensiae* Markgr., n. sp.

Frutex scandens. Folia 3- ad 4-verticillata, oblongo-elliptica, longe acuminata, basi angustata, coriacea, glabra, 6—13 × 2—4 cm, nervi laterales subdistincti, horizontales, 1 mm inter se distantes, petiolus 4—5 mm longus. Inflorescentiae subtenerae, trinodes, thyrsoidae, breviter hirtae, bracteatae et bracteolatae, pedunculus inferiorum non longior quam 5—15 mm, 1—1.2 mm crassus, pedicelli 0—2 mm. Calyx profunde fissus, lobi triangulares, 1—1.2 mm longi, laxe, apicem versus densius pilosi. Corollae tubus 3 mm longus, extus pilosus, lobi 1.2 mm longi, 1.5 mm lati, extus pilosi. Antherae 0.8 mm longae. Ovarium ovatum, 0.6 mm altum, dense pilosum. Caput stigmatis appendicibus apicalibus longiusculis glabris ornatum. Mericarporum articuli 1—2, ellipsoidei, 20 × 13 × 13 mm. Semen 17 × 8 × 8 mm. Embryonis cotyledones oblongi, 10 × 2 mm, costa subtus prominula instructi, radícula 3 mm longa.

Type: *Clemens* 2973, New Guinea, Morobe Dist., Yungzaing, 1300 m (Z).

Distribution: New Guinea, Bismarck Archipelago, Solomon Is.

NEW GUINEA. West. Vogelkop: *Van Royen & Sleumer* 7442, Nettoti Ra., S. slope of Mt. Nettoti, path Andjai-Wekari R., 1800 m; *Beccari s.n.* (FI 6363), Andai near Manokwari. — East. Western Highlands Dist.: *Hoogland & Pullen* 6277, Komun valley (upper Wahgi valley), near Kulikonda village, 1700 m. — Morobe Dist.: *NGF* 12186, Wantoat, 1320 m; *Clemens* 2973, 3588a, Yungzaing, 1350 m. — New Britain: *NGF* 26899, Talasea, Mt. Tangis, W. slopes, 5°39' S 148°18' E, 1050—1500 m; *NGF* 27291, upper Pulei R., Benim village, 5°45' S 248°50' E.

**25. *Alyxia multistriata* Markgr.**

*A. multistriata* Markgr., Notizbl. Berl.-Dahl. 15 (1940) 131; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Rather slender liana. *Leaves* 3-whorled, subcoriaceous, glabrous, elliptic to oblong-elliptic, base rounded, tip rostrate (10 mm) from a rounded blade-end, 10—15 × 5—6 cm, lateral nerves very numerous, 0.5 mm distant, subhorizontal, petiole slender, 2—4 mm long. *Inflorescences* axillary, thyrsoïd, few-flowered, pubescent, 2-noded, peduncle 8—15 mm. *Calyx* lobes ± hirsute, acuminate, 1 mm long. *Corolla* tube 3 mm long, glabrous outside, lobes ovate, obtuse, 1 mm long. *Anthers* 0.8—1 mm long, inserted at the mouth. *Ovary* 0.7 mm high, setose at the base. *Merica*rp with 1—2 ellipsoidal articles, 17 × 12 × 12 mm.

NEW GUINEA. West. Jayapura Dist.: *Docters van Leeuwen* 11293, 11340, Mamberamo R., Albatros bivouac; *Van Royen & Sleumer* 6330, Cycloop Mts., N. of Dozai, Baimungun Creek. — East. W. Sepik Dist.: *NGF* 39232, Ossima, 2°66' S 141°17' E; *NGF* 48259, 48326, Kilifas village, 3°12' S 141°21' E. — Morobe Dist.: *Schodde* 4767, Aseki area, Angabena Ridge, nr. Haumuga village, 1680 m.

**26. *Alyxia floribunda* Markgr.**

*A. floribunda* Markgr., Bot. Jahrb. 61 (1928) 184; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Stout liana. *Branches* angulate. *Leaves* 3- to 6-whorled, coriaceous, elliptic, glabrous, short-acuminate, 8—13 × 3—4.5 cm, petiole 0.5 cm long. *Inflorescence* thyrsoïd, with 4—5 nodes, many-flowered, glabrous, peduncle 4 cm. *Calyx* lobes ovate, obtuse, 3 × 1.5 mm, finely puberulous. *Corolla* tube 3 mm long, glabrous outside, lobes suborbicular, 1.5 mm. *Anthers* 0.7 mm long, inserted at the mouth. *Ovary* 1.3 mm high, slightly pilose. Mature fruit not known.

NEW GUINEA. West. Vogelkop: *BW* 10307, Kebar valley, Mt. Watjetonic. — Geelvink Bay: Japen I., *van Dijk* 695, Sei Papoma nr. Serui. — East. Madang Dist.: *Schlechter* 17705 (type), Kani Mts.

**27. *Alyxia scabrida* Markgr.**

*A. scabrida* Markgr., Bot. Jahrb. 61 (1928) 184; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Liana, mostly scabrous. *Leaves* 3- to 4-whorled, coriaceous, glabrous, obovate-elliptic, acuminate, base cuneate, 10—14 × 5 cm, lateral nerves distinct, 1 mm distant, springing by 80° from the midrib; petiole 2—3 mm long. *Inflorescences* thyrsoïd, with 3—5 nodes, the branches bearing di- or trichasia, rather loose, peduncle rather stout, 2 cm, scabrous. *Calyx* lobes ovate-acute, 2 mm long, hirsute and ciliate. *Corolla* tube 3 mm long, slightly pilose outside, lobes ovate, 1.5 × 1 mm, pubescent outside. *Anthers* 1 mm long. *Ovary* densely pilose, 0.5 mm high. *Merica*rp with one article, 35 × 20 × 20 mm.

NEW GUINEA. East. Madang Dist.: *Schlechter* 16841 (type), forests along the Kaulo R. — Eastern Highlands Dist.: *Pullen* 653, Duanantina valley E. of Goroka, 1560 m. — Morobe Dist.: *Hartley* 11528, Kuali Creek, 5 miles S. of Wau. — Milne Bay Dist.: *Brass* 23677, Maneau Ra., N. slopes of Mt. Dayman, 700 m. — New Britain. *Panoff* 217, Vairamana.

**28. *Alyxia kabaenae* Markgr., n. sp.**

Frutex scandens. *Folia* ternato-verticillata, coriacea, glabra, obovato-elliptica, apice acuta vel brevissime acuminata, basi cuneata, lamina 12—14 × 4—5.5 cm, nervi laterales recti, sub angulo 80° e costa oriundi, 2—3 mm inter se distantes; petiolus crassiusculus, ad 1 cm longus. *Fructescentia* brevis, axillaris, pedunculus crassiusculus, 8 mm longus. *Mericarpii articuli* singuli (videntur), ellipsoidei, 25 × 16 × 16 mm. Semen 23 × 14 × 11 mm, ruminatum. Embryonis cotyledones undulati, oblongi, 16 × 3 mm, radícula 4 mm longa.

**T y p e:** *Elbert 3415* (L), Kabaena I. (S. of Celebes), Balo Dist., Eempuhu, 200 m, in shrub forest.

**N o t e:** This is the only representative of series *Floribundae* west of New Guinea. The large fruit articles and the undulate cotyledons prove that it belongs to this series. Because of remnants of hirsute hairs in the infructescence it may be closely related to *A. scabrida* Markgr.

**29. *Alyxia fragrans* Merr. & Perry**

*A. fragrans* Merr. & Perry, J. Arn. Arb. 24 (1943) 212.

Liana. *Leaves* 4-whorled, coriaceous, glabrous, obovate-elliptic, base cuneate, 5—9 × 2.5—4.5 cm, lateral nerves indistinct, 2 mm distant, subhorizontal, petiole 5—9 mm long, stout. *Inflorescences* thyrsoid, loose, with 3 nodes, pubescent, peduncle up to 7 cm long, bracts conspicuous, 2—3 mm long, carinate, pubescent, pedicels 1—2 mm long, stout. *Calyx* lobes ovate, obtusely acuminate, densely pubescent, 3.5 mm long. *Corolla* tube 4 mm long, glabrous outside, lobes oblong, 1.5 mm long. *Anthers* 1.2 mm long. *Ovary* 0.7 mm high, densely pilose. *Mericarps* with 1—2 articles, these subglobose, about 16 × 12 × 12 mm, seed 15 × 9 mm. Cotyledons of the embryo oblong, obtuse, 9 × 4 mm, undulate-crispate, radicle 1.5 mm long.

**NEW GUINEA.** West. Geelvink Bay, Wissel Lake region: *BW 3039*, Arupa, 1750 m; *BW 8942*, E. foot Pekeglbaro, Kebo; *Eyma 4340*, nr. bivouac Prauw; *Eyma 4783*, Enarotali-Kugapa, heath vegetation. — Jayapura Dist.: *Brass 11300*, 11577, 18 km E. of Lake Habbema, Bele R., 2350 m. — East. Eastern Highlands Dist.: *Hartley 12067*, Akuna 6°21' S 145°56' E.

**Series 7. DEFOLIATAE Markgr., n. ser.**

Frutices sarmentosi vel scandentes. *Folia* coriacea, 3- ad 4-verticillata, multinervia, elliptica vel obovata, nervi laterales distincti, 1 mm inter se distantes. *Inflorescentiae* pauciflorae, 1- ad 3-nodes, pedunculi breves, pedicelli breves sed distincti, infra florem saepe prophyllum unicum, latiusculum. *Corollae tubus* 2—3 mm longus. *Ovarium* setosum. *Mericarpia* 1- ad 2-articulata, articuli ellipsoidei, plerique 10 × 6 × 6—12 × 8 × 8 mm.

**T y p e:** *Alyxia defoliata* Markgr.

**D i s t r i b u t i o n:** 7 species, one of which in New Guinea and the Philippines, 3 in New Guinea, 1 in the Sula Is., 1 in the Lesser Sunda Is. and Moluccas.

**KEY TO THE SPECIES OF SERIES 7. DEFOLIATAE**

1. Leaves short-elliptic, short-acuminate, 2.5—7 × 1.2—3.5 cm. Inflorescence rather stout, peduncle 2—5 mm long. . . . . **30. *A. defoliata***
1. Leaves obovate, oblanceolate, or oblong-elliptic, but then longer. Inflorescence slender, peduncle longer than 5 mm.

2. Leaves small, 2—6×0.5—2 cm. Inflorescence mostly 1-noded.
3. Liana. Leaves narrowly oblanceolate to lanceolate, obtuse, 3—4(—6)×0.7—0.8 (—1.2) cm, lateral nerves indistinct. Ovary pilose. Fruit article pubescent, 11×7×7 mm (immature) . . . . . **31. *A. palawanensis***
3. Shrub, often scrambling. Leaves broadly oblanceolate, acuminate, 2—5×0.5—2 cm, lateral nerves distinct, fine, 0.5 mm distant. Ovary glabrous. Fruit article glabrous, 13×7×7 mm. . . . . **32. *A. arfakensis***
2. Leaves oblong-elliptic to oblong-obovate, 4—13×1—4 cm. Inflorescence mostly 2- to 3-noded.
4. Leaves short-acuminate, lateral nerves 1 mm distant. Corolla tube 2 mm long. Ovary and stigma head glabrous. . . . . **33. *A. purpureoclada***
4. Leaves obtuse or obtusely acute, rarely acuminate, lateral nerves 2—3 mm distant. Corolla tube 3 mm long. Ovary setose. Stigma head finely pilose.
5. Leaves 3.5—8×0.6—1.7 cm, lateral nerves 2 mm distant. Inflorescence hirsute or puberulous.
6. Inflorescence loose, puberulous. Calyx lobes puberulous, ovate-acute, 1×0.7 mm. Corolla lobes obliquely ovate, 1.5×1 mm. Fruit articles 12×10×10 mm. . . . . **34. *A. blancoi***
6. Inflorescence dense, hirsute. Calyx lobes hirsute, oblong-ovate, obtuse, 2.5×0.8 mm. Corolla lobes obliquely oblong, 3×1 mm. Fruit articles 7×6.5×6.5 mm. . . . . **35. *A. spanogheana***
5. Leaves 6—13×2—4 cm, lateral nerves 3 mm distant. Inflorescence glabrous. . . . . **36. *A. sulana***

### 30. *Alyxia defoliata* Markgr.

*A. defoliata* Markgr., Nova Guinea 14 (1926) 280; Bot. Jahrb. 61 (1928) 186; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Sarmentose shrub 1—5 m high. *Leaves* 3-whorled, coriaceous, glabrous, elliptic, acuminate, base sinuately narrowed, 2.5—7×1.2—3.5 cm, lateral nerves numerous, 1 mm distant, petiole 5—7 mm. *Inflorescences* thyrsoid, glabrous, 2-noded, peduncle 2—5 mm long, each node with 2 dichasia, pedicels 1—2 mm long. *Calyx* lobes ovate, obtuse, puberulous and ciliate, 1.2—1.8 mm long. *Corolla* tube 2.5—3 mm long, glabrous outside, lobes ovate, obtuse, 2.5—3×1—1.2 mm. *Anthers* 1.2 mm long. *Ovary* 1 mm high, densely setose. Stigma head setose above. *Mericarps* with 1—4 articles 9—10×7—8×7—8 mm.

**Distribution:** New Guinea.

#### a. subsp. *defoliata*.

*Leaves* broad-elliptic, short-acuminate, 1.5—3.5 cm broad. *Fruit* articles 10×7×7 mm.

**Type:** *Pulle 1115*, New Guinea, in monte Treub (U).

NEW GUINEA. West. Geelvink Bay: *Eyma 5398*, Wissel Lakes, track Bogesiga to Arabu bivouac. — Snow Mts.: *Pulle 1115*, Treub Mts., 2400 m; *Pulle 792*, Mt. Hellwig, 2500 m.

#### b. subsp. *orientalis* Markgr., n. subsp.

*Folia* lanceolato-elliptica, satis longe acuminata, 1.2—2 cm lata. *Fructuum articuli* 9×8×8 mm.

**Type:** *BW 10475*, New Guinea, Hollandia, Wiligimaan (L).

**E c o l o g y:** Frequent in *Nothofagus*- and *Araucaria*-forest.

NEW GUINEA. West. Jayapura Dist.: BW 10475, Baliem, Wiligimaan. — East. Morobe Dist.: Clemens 8423a, mountains above Boana; NGF 44099, Yamap, head of Baime Creek, 1800 m, 7°03' S 146°47' E. — Central Dist.: NGF 44099, road from Wotape to Kosipi, Mt. Wosa, 2100 m, 7° S 147° E. — Milne Bay Dist.: Brass 22945, 23344, Maneau Ra., N. slopes of Mt. Dayman, 1800 & 2150 m; LAE 54967, Mt. Suckling area, Mayu II, 1845 m.

**31. *Alyxia palawanensis* Markgr., n. sp.**

Frutex scandens gracilis. Rami teretes, iuveniles quadranguli et puberuli. Folia 4-verticillata, coriacea, glabra, oblanceolata vel lanceolata, gradatim in apicem obtusum et basin cuneatam angustata, evenia, (2—)3—4(—6) × (5—)7—8(—12) cm, supra nitidula, subtus minute papillosa, petiolus 2 mm longus, puberulus. Inflorescentiae breves, puberulae, 1- ad 2-nodes, pedunculus 8—10 mm longus. Lobi calycis breviter ovati, acutiusculi, extus puberuli, 1 × 0.5 mm. Corollae extus glabrae tubus 3 mm longus, lobi oblique ovati, acutiusculi, 0.9 mm longi, alabastrum obtusum formantes. Antherae ovatae, acutae, 0.6 mm longae, sub ipsa fauce insertae. Ovarium subglobosum, 0.5 mm altum, pilosum. Mericarpiorum articuli ellipsoidei, pubescentes, 11 × 7 × 7 mm (immaturi).

T y p e: PNH 12397, Philippines, Palawan, Panacan, Aborlan, Victoria Mountains, SE. slope, rocky ridge, 900 m, dense low forest (L).

N o t e: A similar fruiting specimen has been collected in Borneo: BRUN 2330, Brunai, Pagon Ridge, moss forest, 1500 m, leg. P.S. Ashton.

**32. *Alyxia arfakensis* Kan. & Hat.**

*A. arfakensis* Kan. & Hat., Bot. Mag. Tokyo 55 (1941) 489, fig. 1.

Sarmentose shrub. Leaves 3-whorled, coriaceous, glabrous, oblanceolate, obtusely acute, base cuneate, 2—5 × 0.5—2 cm (mostly 4 × 1.8 cm); lateral nerves subhorizontal, very fine and dense, 0.5 mm distant; petiole 3—5 mm long. Inflorescence slender, 1- to 2-noded, few-flowered, peduncle 4—6 mm long. Calyx lobes ovate, acute, 1 mm long, pubescent and ciliate. Corolla tube 3 mm long, glabrous outside, lobes obtuse, sub-orbicular, 1.3 mm long. Anthers 0.9 mm long. Ovary ovate, 0.6 mm high, glabrous. Stigma head with short apical appendages. Mericarps with one article 13 × 7 × 7 mm.

NEW GUINEA. West. Vogelkop, Anggi Lakes: Kanehira & Hatusima 13717 (type), summit of Mt. Kubre, 2300 m; Sleumer & Vink 4434, Anggi Gigi Lake, nr. Iray, 1950 m. — Jayapura Dist.: Van Royen & Sleumer 6041, Cycloop Mts., NE. slope of Mt. Rara, 1600 m.

**33. *Alyxia purpureoclada* Kan. & Hat.**

*A. purpureoclada* Kan. & Hat., Bot. Mag. Tokyo 55 (1941) 491, fig. 3.

Liana. Leaves 3-whorled, coriaceous, glabrous, elliptic-oblong to obovate-oblong, short-acuminate, base cuneate, 5—10 × 1.5—3 cm, lateral nerves subhorizontal, 1 mm distant; petiole 5—10 mm. Inflorescences thyrsoid, slender, 3-noded, few flowered, glabrous; peduncle 1—1.5 cm. Calyx lobes ovate, glabrous, short-ciliate, obtuse, 1.2—1.5 mm long. Corolla tube 2 mm long, glabrous outside, lobes ovate, 0.6 mm long. Anthers 1 mm long. Ovary globular, glabrous, 0.5 mm high. Mericarps with 1—4 articles 10 × 6 × 6 mm.

**E c o l o g y:** Mossy *Nothofagus* forest and summit scrub.



NEW GUINEA. West. Vogelkop: *Van Royen & Sleumer 7915*, Nettoti Ra., path Andjai-Wekari R., 1650 m; *Kanehira & Hatusima 13466* (type), Anggi Lakes; *Kostermans 2283, 2374, 2452*, trail to Anggi Gita Lake, 1900—2000 m; *BW 11452*, Arfak Mts., Mt. Beribai, 2000 m. — Jayapura Dist.: *Kostermans & Sugeng 726*, Baliem valley above Wellesey, 2500 m. — East. Morobe Dist.: *Clemens 8314a*, Sarawaket Mts., Abe, 1200—1800 m; *Brass 29644*, Kaindi, 2060 m.

### 34. *Alyxia blancoi* Merr.

*A. blancoi* Merr., Philip, J. Sc. 7 (1912) Bot. 330; Sp. Blanc. (1918) 310; En. Philip. 3 (1923) 327; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166. — *Brabejum lucidum* Blanco, Fl. Filip. ed. 2 (1845) 40. — *A. acuminata* K. Schum. var. *lancifolia* Markgr., Nova Guinea 14 (1928) 280; Bot. Jahrb. 61 (1928) 182.

Liana. Branches terete, glabrous. Leaves 3- to 4-whorled, sub-coriaceous, glabrous, oblanceolate, blunt-acute, base cuneate, 3.5—8 × 0.6—1.4 cm, lateral nerves indistinct, 2 mm distant, petiole 1.5—4 mm. Inflorescence slender, thyrsoid, finely puberulous, 2-noded, side branches with 1—3 flowers, pedicels 0—2 mm. Calyx lobes ovate, acute, puberulous, 1 × 0.7 mm. Corolla slightly pilose outside, tube 3 mm, lobes obliquely ovate, 1.5 × 1 mm, papillate inside. Anthers 0.8 mm long. Ovary globose, 0.5 mm high, setose. Mericarp with one article 12 × 10 × 10 mm.

PHILIPPINES. Cebu: *BS 11118* (fr.). — Luzon: *BS 76053* (fr), Camarines Sur, Mt. Madooy.  
NEW GUINEA. West. Jayapura Dist.: *Gjellerup 987* (fl.), Humboldt Bay.

### 35. *Alyxia spanogheana* Miq.

*Fagraea tetragona* Spanoghe, Linnæa 15 (1841) 326. — *A. spanogheana* Miq., Fl. Ind. Bat. 2 (1857) 409. — Type: drawing from coll. Spanoghe (L sh. 941.6—217; photograph in K).

Liana. Branches hispidulous. Leaves 3- or 4-whorled, coriaceous, glabrous, ovate- to obovate-lanceolate, blunt to acute, base cuneate, 4—8 × 1—1.7 cm; lateral nerves 2 mm distant; petiole 3—5 mm. Inflorescence short, hispid, thyrsoid, 3-noded; peduncle 5—7 mm. Flowers few, subsessile. Calyx lobes ovate, obtuse, 2.5 × 0.8 mm, hispidulous. Corolla white, outside glabrous, tube 3 mm, lobes oblong, obtuse, 3 × 1 mm. Anthers 0.8 mm long, inserted below the throat. Ovary 0.6 mm high, densely setulose; stigma head setulose at the apex. Mericarp with one article, 7 × 6.5 mm.

LESSER SUNDA Is. Flores: *Verheijen 1900, 1901, Kostermans 22033*, W. Flores, S. coastal part. — Timor: *Schmutz 2312*, Oéolo, 700 m. — Wetar: *Bloembergen 3566*, rain forest along Meta Leraï, 700—900 m.

### 36. *Alyxia sulana* Markgr., n. sp.

Frutex scandens. Folia 4-verticillata, coriacea, glabra, obovato-elliptica, obtusa vel breviter acuminata, basi cuneata, 6—13 × 2—4 cm; nervi laterales distincti, 3 mm inter se distantes, angulo 70° e costa oriundi; petiolus 2—5 mm longus. Inflorescentiae uninodes, parvae, tenerae, glabrae; pedunculus 12 mm longus, 0.5 mm diam., pedicelli 3—6 mm longi. Bractaeae 0.5 mm longae. Calycis lobi ovato-lanceolati, 2 × 0.5 mm, glabri, glanduloso-ciliati. Corollae tubus 2.5 mm longus, extus glaber, lobi oblique oblongo-ovati, obtusi, 2 × 1 mm. Antherae 1.7 mm longae, infra ipsam faucem insertae. Ovarium 0.5 mm altum, glanduloso-punctatum. Caput stigmatis apice setulosum. Fructus desunt.

Type: *Van Hulstijn 59*, Sula Is., Western Moluccas (L), Taliabu, Tandjong Berpua.

Series 8. SUBALPINAE Markgr., *n. ser.*

Frutices erecti vel sarmentosi. *Folia* obtusa vel obtuse acuta, raro acuminata, bene coriacea, obovato-elliptica, parva, 5(—6) × 3 cm non excedentia, margine revoluta. *Inflorescentiae* pauciflorae, brevissime pedunculatae. *Corollae* tubus 4(—5) mm longus, lobi breviter ovati. *Articuli mericarporum* singuli, raro bini, ellipsoidei, 15 × 12 × 12 mm (in *A. royeniana* minores).

Type: *Alyxia subalpina* Markgr.

Distribution: 5 species in the subalpine belt of New Guinea.

## KEY TO THE SPECIES OF SERIES 8. SUBALPINAE

1. Leaves broad-elliptic, obtusely acute. Corolla tube pilose outside below the mouth, lobes obtuse. Ovary densely long-pilose. . . . . 37. *A. subalpina*
1. Leaves obtuse, rounded at the tip. Corolla tube glabrous or with some scattered hairs outside (unknown in *A. royeniana*), lobes minutely apiculate. Ovary with short or scattered hairs.
  2. Leaves 3- to 5-whorled, obovate with cuneate base, 1.5—6 × 0.6—3 cm. Fruit articles about 15 × 12 × 12 mm.
    3. Leaves broader, (0.8—)1.2—1.5(—3) cm broad. Inflorescences erect, with 1—2 nodes, peduncle distinct, 0.5—4 mm long.
      4. Erect shrub. Leaves thickly coriaceous, 3—6(—9) × 1.5—4 cm. Peduncle 0.5 mm long. Calyx lobes 2 mm long. Corolla glabrous outside. Ovary with scattered hairs . . . . . 38. *A. cacuminum*
      4. Sarmentose shrub. Leaves coriaceous, 2—3(—4) × 0.8—1.5 cm. Peduncle 3—4 mm long. Calyx lobes 2.5—3 mm long. Corolla tube with some few hairs outside. Ovary with short, thick hairs. . . . . 39. *A. semipallescens*
    3. Leaves narrow, 0.6—1.2 mm broad (1.5—4 cm long). Flowers nodding, often solitary. Peduncle of inflorescence if developed 2 mm long . . . . . 40. *A. punctata*
  2. Leaves 2- to 3-whorled, very small, 0.8—1 × 0.7—0.8 cm, broad-elliptic to sub-orbicular, with rounded base. Fruit articles 9 × 8 × 8 mm. . . . . 41. *A. royeniana*

37. *Alyxia subalpina* Markgr.

*A. subalpina* Markgr., Bot. Jahrb. 61 (1928) 183; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Sarmentose shrub, younger parts hirtellous. *Leaves* 3-whorled, coriaceous, glabrous, elliptic, obtusely acute, the uppermost ones sometimes sublanceolate, 2.5—5(—6) × 1.5—3 cm, margins revolute, lateral nerves indistinct, petiole 2—5 mm long. *Inflorescences* pubescent, peduncle 3 mm long, few (mostly 3)-flowered, one-noded. *Calyx* lobes ovate, obtuse, pubescent, 1.5 mm long. *Corolla* tube 4 mm long, hairy outside near the mouth, lobes 2 mm long, ovate, ciliate. *Anthers* 1.5 mm long. *Ovary* densely long-pilose, 0.7 mm high. Stigma head with rather long apical appendages and with some apical bristles. *Mericarps* with 1—2 articles 15 × 12 × 12 mm.

Ecology: Lower montane rain forest to upper montane mossy forest.

NEW GUINEA East. Sepik Dist.: Ledermann 12760 (type), Felsspitze, 1400—1500 m, 4°10' S 141°30' E; NGF 41683, Oksapmin, 1800 m. — Southern Highlands Dist.: Kalkman 4718, 4733, N. slopes Mt. Kerewa, 2940 m; Mt. Né: Vink 17271, 3060 m, NGF 26972, 2800 m, NGF 32006, 2000 m; NGF 25143, Ibiwara,

Tari Gap, 2500 m; NGF 32985, Mt. Giluwe, Tambul to Mendi, Kaguba, 2700 m. — Eastern Highlands Dist.: Mt. Wilhelm: Pullen 293, 2650 m, Brass 30338, 2770 m, Stauffer 5646, 2850 m, Borgmann 176, 3000 m; Hoogland & Pullen 5624, Goroka Subdist., Kerigomna Camp, 2850 m. — Morobe Dist.: Clemens 8925a, Samanzing, 1800 m; Craven & Schodde 1281, Wengomanga, via Oiwa, Aseki patrol area, 2500 m; NGF 22825, 22829, Wau-Salamaua Rd., 2100 m. — Central Dist.: Carr 14972, Boridi, 1500 m. — Milne Bay Dist.: LAE 55622, scarp of Tantam plateau above Mayu R., Mt. Suckling, 1980 m.

### 38. *Alyxia cacuminum* Markgr.

*A. cacuminum* Markgr., Nova Guinea 14 (1926) 281; Bot. Jahrb. 61 (1928) 186; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Erect shrub 1–2 m. Branches angulate. Leaves 4- to 5-whorled, thickly coriaceous, glabrous, obovate, obtuse, base cuneate, margins revolute, 3–6(–9) × 1.5–3(–4) cm, lateral nerves indistinct below, subdistinct above, 2 mm distant, springing under 70° from the midrib, petiole 0–0.5 cm. Inflorescences glabrous, 1- to 2-noded, peduncle 0.5 cm long, with few dichasia, pedicels 1–2 mm long. Calyx lobes ovate, obtuse, glabrous, short-ciliate, 2 mm long. Corolla tube 4 mm long, glabrous outside, lobes broad-ovate, 2.5 × 2 mm. Anthers 1.2 mm long. Ovary globose, 0.5 mm high, with some long hairs. Mericarps with one ellipsoidal scabrous article 24 × 12 × 12 mm. Seeds (immature) 14 × 7 × 7 mm.

**Ecology:** Heath vegetation and mossy forest, mossy thickets on peat ridges. Said to be common.

**NEW GUINEA.** West. Geelvink Bay: Eyma 4808, Wissel Lakes, Enarotali-Koegapa, heath vegetation. — Jayapura Dist.: Brass 12679, Idenburg R., 18 km SW. of Bernhard Camp, 2150 m. — Snow Mts.: Brass 9114, Lake Habbema, 3225 m; Versteeg 2463 (type), Kajan Mts., 3200 m; Pulle 1021, Mt. Wichmann, 3000 m.

### 39. *Alyxia semipallescens* F. v. M.

*A. semipallescens* F.v.M., Trans. R. Soc. Vict. 1 (1889) 28; Markgr., Bot. Jahrb. 61 (1928) 183; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166. — *A. lamii* Markgr., Nova Guinea 14 (1926) 280; Bot. Jahrb. 61 (1928) 183; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Sarmentose shrub, young parts pubescent. Leaves 3- to 5-whorled, coriaceous, glabrous, obovate or oblanceolate, obtuse or shortly and obtusely acuminate, margin revolute, 2–2.5(–3.5) × 0.8–1(–1.5) cm, lateral nerves indistinct, petiole 4–5 mm long. Inflorescences pubescent, one- to two-noded, few-flowered, often with only two flowers at a node, peduncle 3–4 mm long. Calyx lobes ovate, obtuse, pubescent, 2.5–3 mm long. Corolla tube 4–5 mm, with some scattered hairs outside near the mouth, lobes ovate, ciliate, 2.5–3 mm long. Anthers 1.5 mm long. Ovary 0.7 mm high, long-pilose. Mericarps with mostly 1 article of 15 × 12 × 12 mm, papillate.

**NEW GUINEA.** West. Jayapura Dist.: H. J. Lam 1726, 1732, 1757, 1987, Mt. Doorman, 2540 and 3260 m, *Dacrydium-fruticetum*. — Snow Mts.: Von Römer 719, 1210, 1256, Mt. Hellwig, 2000 m. — East. Western Dist.: NGF 42848, Hongkong Hill, Ok Tedi headwaters, 2070 m, 5°13' S 141°08' E. — Central Dist.: MacGregor s.n. (type), Mt. Musgrave.

**Note:** The only difference against *A. lamii* Markgr. in the original description of *A. semipallescens* — the glabrous ovary — does not hold: the type specimen of *A. semipallescens* (kindly lent by MEL) shows the same thick hairs on the ovary as *A. lamii*.

40. *Alyxia punctata* Kan. & Hat.

*A. punctata* Kan. & Hat., Bot. Mag. Tokyo 55 (1941) 489, fig. 2.

Shrub of 2—3 m, young parts pubescent. *Leaves* 3-whorled, coriaceous, glabrous, obovate, obtuse, base cuneate, 1.5—4 × 0.6—1.5 cm, shining above, lateral nerves indistinct, petiole 2—5 mm long. *Inflorescences* axillary, nodding, one-noded, peduncle up to 2 mm long, with 3 flowers, often flowers solitary, without peduncle, as a whole 6—10 mm long. *Calyx* lobes ovate, pubescent and ciliate, 1.5—2 mm long. *Corolla* tube 4 mm long, glabrous outside, lobes ovate, ciliate, 2 × 1.5 mm. *Anthers* 0.9 mm long, inserted at the mouth. *Ovary* globular, 0.6 mm, setose, stigma head with short pilose apical appendages. *Mericarps* with 1—2 subglobular articles, 12—15 × 9—11 mm. Embryo: cotyledons oblong, 5 × 2 mm, with undulate margins, radicle 3 × 1.5 mm.

NEW GUINEA. West. Vogelkop: *Van Royen & Sleumer 7965, 8213*, crest of Nettoti Ra., 2100 and 1900 m; *Kostermans 2135, 2180*, Anggi Gita Lake (*locus classicus*), 2000 m. — Snow Mts.: *Kalkman 4473*, Star Mts., Mt. Antares, 3000 m. — *Mayr 647*, sine loco (U), prob. Cycloop Mts.

**Note:** The name-giving points on the lower leaf surface are irregularly distributed, occasionally even on the midrib; there are leaves without points too, and in specimens from 3000 m altitude there are no points at all. The microscope reveals at older leaves minute grooves, closed by cork cells (kindly verified by Dr. Baas, Rijksherbarium). In younger leaves they appear as brown spots protruding through a destroyed epidermal cell. Probably they are traces of insect stings.

41. *Alyxia royeniana* Markgr., *n. sp.*

Frutex vel arbuscula usque ad 4 m alta, *ramuli* subsarmentosi, hirtelli. *Folia* opposita vel ternato-verticillata, valde coricea, glabra, (0.6—)0.8—1.2 × (0.3—)0.7—0.8 cm, elliptica vel obovata, obtusa, basi rotundato-angustata; nervi laterales indistincti; petiolus 1—2 mm longus, hirtellus. *Inflorescentia* uniflora videtur. *Calycis lobi* ovati, acuti, pubescentes, 1.5 mm longi. *Corolla* incognita. *Mericarpi* uniarticulata, articulus 9 × 8 mm, semen 8 × 7 mm; embryonis cotyledones oblongi, obtusi, inaequales (an semper?), 4 × 1 mm et 2.5 × 1 mm, radícula 2 × 0.6 mm.

**Type:** *Van Royen NGF 20398* (L).

**Ecology:** Ericaceae-Myrtaceae shrubbery around open part of crest.

NEW GUINEA. East. Central Dist.: *Van Royen NGF 20398*, 14-1-1965, Mt. Awormange, E. of Waitape, 7° S 147° E.

Series 9. MICROPHYLLAE Markgr., *n. ser.*

Frutices scandentes graciles. *Folia* e minoribus generis, subcoriacea, lanceolata vel lineara, apice obtuso, saepius minute emarginato. *Inflorescentiae* graciles, pauciflorae. *Corollae* tubus 2—4 mm longus, lobi ovato-rotundati, alabastrum obtusum formantes. *Fructuum articuli* (ubi noti) e minimis generis, versus 5 mm diam.

**Type:** *Alyxia microphylla* Markgr.

**Distribution:** 4 species, of which 1 in mountain forests of the Malay Peninsula, 1 in lowland rain forest of Palawan Island, 2 in mountain forests of New Guinea.

## KEY TO THE SPECIES OF SERIES 9. MICROPHYLLAE

1. Leaves short-lanceolate, top short-acuminate, index 2—4 : 1.
  2. Leaves small,  $1.5-3.5 \times 0.8-1.4$  cm. Calyx lobes glabrous on the face, 1.2 mm long. Corolla tube 2 mm long. Fruit article ellipsoidal,  $7 \times 4 \times 4$  mm.
 

**42. *A. microphylla***
  2. Leaves larger,  $2.5-4.5 \times 0.8-1.7$  cm. Calyx lobes hirtellous, 1.5 mm long. Corolla tube 3 mm long (in well developed buds). Fruit articles globular, 5.5 mm diam.
 

**43. *A. calcicola***
1. Leaves long-lanceolate or linear, narrow, index 9—10 : 1.
  3. Leaves long-lanceolate with cuneate base,  $5-7.5 \times 0.8-1.3$  cm. Corolla tube 2 mm long. Fruits unknown. Calyx lobes suborbicular,  $1 \times 1$  mm. . . . **44. *A. pugio***
  3. Leaves linear, rounded at base and apex,  $3-5 \times 0.2-0.4$  cm. Corolla unknown. Fruit article globular, 5 mm diam. Calyx ovate,  $1.5 \times 1$  mm. . . **45. *A. linearis***

**42. *Alyxia microphylla* Markgr., n. sp.**

Frutex sarmentosus 1.5 m altus. *Ramuli* juniores hirtelli, subteretes. *Folia* tri- vel quadri-verticillata, subcoriacea, glabra, ovato-lanceolata, apice obtusa, basi cuneata,  $1.5-3.5 \times 0.7-1.4$  cm, nervi laterales indistincti, 1 mm inter se distantes, sub angulo  $70^\circ$  e costa oriundi. *Inflorescentiae* axillares, graciles, pedunculo  $7 \times 0.5$  mm, uninodes, pauciflorae. Bractae lineares, 1.5 mm longae. Pedicelli 2 mm longi, subpilosi. *Lobi calycis* ovals, obtusi, glabri,  $1.2 \times 1$  mm. *Tubus corollae* 2 mm longus, extus sparsim pilosus, lobi ovarii,  $1.5 \times 1$  mm. *Antherae* 0.7 mm longae, faucem attingentes. *Ovarium* globosum, glabrum, vix 0.5 mm altum. Caput stigmatis claviforme, breviter biapiculatum. *Mericarpi* uni- vel biarticulata articuli ellipsoidei (immaturi  $7 \times 4$  mm).

T y p e: *Brass 12180* (L).

NEW GUINEA. West. Geelvink Bay, Wissel Lake region: *Eyma 5268*, lookout Perai, 2400 m; *5373*, summit Mt. Digatara; *5421*, between Enarotali and Bubeiro. — Jayapura Dist.: *Brass 12627*, *12180*, Idenburg R., 18 km SW. of Bernhard Camp, 2100—2150 m.

E c o l o g y: In stunted mossy forest.

**43. *Alyxia calcicola* Markgr., n. sp.**

Fruticulus scandens. *Folia* 2- vel 3-verticillata, subcoriacea, glabra, lanceolata, basi subcuneata, apice obtuse acuminata,  $2.5-4.5 \times 0.8-1.7$  cm, petiolus 3 mm longus. *Inflorescentiae* axillares, albo-hirtellae, binodes, pedunculus 2—3 mm longus, bractae 1.5 mm longae, pedicelli 2 mm longi. *Lobi calycis* lineari-triangularis, acuti, dense hirtelli,  $1.5 \times 0.8$  mm. *Corollae* extus glabrae alabastrum subacutiusculum, tubus (iuvencilis) 3 mm longus, lobi ovals,  $1.2 \times 0.7$  mm. *Antherae* breviter ovatae, 0.7 mm longae, sub ipsa fauce insertae. *Ovarium* globosum, 0.5 mm altum, supra basin humilem glabram dense setosum. Caput stigmatis globulare, glabrum, breviter biapiculatum, antheras attingens. *Mericarpi* uniarticulata, articuli globosi, laeves, 5.5 mm diam. Embryonis cotyledones plani, oblongo-lineares, obtusi, radícula 2 mm longa aequilongi et vix latiores.

T y p e: *Smitinand & Sleumer 1275*, Malay Peninsula (southernmost Thailand), Surat, Khao Pak Chon, 55 km W. of Surat, road to Takuapa, 200 m, 25.9.1963 (L).

MALAY PENINSULA. Kelantan. Ulu Kelantan, Gua Musang, *Unesco limestone expedition 1962*, no. 305; S. Nenggiri, Gua Jaya at K. Jenera, limestone hill, *FRI 4238*. — Pahang. Gua Tipus near Chegar Perak, on dry top of limestone hill, *Henderson 19466*. — Selangor. *Ding Hou 718*, Batu Cave, limestone hill ridge, 200 m.

**44. *Alyxia pugio* Markgr.**

*A. pugio* Markgr., Bot. Jahrb. 61 (1928) 182; Kan. & Hat., Bot. Mag. Tokyo 55 (1941) 491; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Slender liana. *Leaves* 3-whorled, subcoriaceous, glabrous, lanceolate, long-acuminate with obtuse tip, base cuneate,  $5-7.5 \times 0.8-1.3$  cm, lateral nerves indistinct. Petiole 4 mm long. *Inflorescences* slender, 2-noded, white papillate, side branches with 1—2 flowers each. Peduncle 12 mm long, pedicels 2 mm long. *Calyx* lobes broad-ovate, pubescent, 1 mm long. *Corolla* tube 2 mm long, glabrous outside, lobes ovate-orbicular, 1.5 mm long. *Anthers* 0.8 mm long, inserted below the mouth, included. *Ovary* globular, 0.5 mm high, with some minute hairs. *Fructescence* slender, peduncle 0.5 mm diam., 1—1.5 cm long. *Mericarps* 1—2, subglobose, black, 8 mm diam.; seed 6 mm diam. Cotyledons of the embryo oblong,  $3.5 \times 2$  mm, radicle 3.5 mm long.

NEW GUINEA. East. Sepik Dist.: Ledermann 9941, Lordberg,  $142^{\circ}30' E$ ,  $4^{\circ}50' S$ , 1000 m, light mossy mountain forest; Papua, Mt. Bosavi,  $6^{\circ}26' S$   $142^{\circ}50' E$ , 1250—1350 m, M. Jacobs 8727 (L).

**Note:** The leaves of this species resemble very much those of *A. stenophylla* Merr., but the flowers are different: in *A. stenophylla* the calyx lobes are 1.5 mm long, acute (not 1 mm and obtuse), the tube of the open corolla is 6 mm long (not 2 mm), the lobes 2.6 mm (not 1.5). The corolla bud is acute, not obtuse.

**45. *Alyxia linearis* Markgr., nom. nov.**

*A. rosmarinifolia* Merr. & Quis., Philip. J. Sc. 82 (1954) 335, non Guill.

Slender liana. *Branches* terete, glabrous. *Leaves* 2- to 4-whorled, subcoriaceous, glabrous, linear, rounded at base and apex,  $3-5 \times 0.2-0.4$  cm, lateral nerves indistinct, petiole 1—3 mm long. *Inflorescence* axillary, slender, one-flowered, peduncle 6—12 mm. *Calyx* lobes ovate, obtuse,  $1.5 \times 1$  mm. *Merica* with one globular article, 5 mm diam.

PHILIPPINES. Palawan. PNH 176, Bacungan, Puerto Princesa.

**Series 10. LAXIFLORAE Markgr., n. ser.**

Frutices scandentes graciles. *Folia* subcoriacea vel subchartacea, saepe longe acuminata. *Inflorescentiae* laxae, pauciflorae. *Corollae* tubus 3—7 mm longus, lobi ovato-lanceolati, alabastrum acutum, longiuscule acuminatum formantes. *Articuli fructuum* solitarii vel plures, saepius  $12 \times 8 \times 8$  mm.

**Type:** *Alyxia laxiflora* Merr.

**Distribution:** 10 species, whereof 4 in the Philippines, 3 in New Guinea, 1 in Celebes, 1 from Celebes to the Moluccas and the Philippines, and 1 in New Caledonia (*A. leucogyne* v. Heurck & Müll. Arg. ex aff. *A. markgrafii* Tsiang).

**KEY TO THE SPECIES OF SERIES 10. LAXIFLORAE**

1. Leaves elliptic to oblanceolate-elliptic, about 2.5 times as long as broad.
2. Leaves rostrate,  $6-10 \times 2.5-5$  cm, lateral nerves well distinct when dry,  $0.5-1$  mm spaced . . . . . **46. *A. sogerensis***

2. Leaves not rostrate, not longer than 6 cm, lateral nerves not well distinct, 2—3 mm spaced.
3. Leaves 3-whorled, short-elliptic, 4—6 × 1.5—2.5 cm, short-acuminate. Inflorescence with 2 nodes. . . . . 47. *A. laxiflora*
3. Leaves 4- to 5-whorled, oblanceolate-elliptic, 3—4 × 1—1.5 cm, obtusely acute or obtuse, lateral nerves invisible. Inflorescence with 1 node. 48. *A. ecostata*
1. Leaves lanceolate or oblanceolate, 4 to 10 times as long as broad.
4. Leaves 6—9 cm long, 4—4.5 times as long as broad.
5. Lateral nerves 1 mm spaced. Inflorescence 2—2.5 cm long, peduncle 15—20 mm long, 1 mm in diam. Calyx lobes 1.2—1.5 mm long. Corolla lobes about 2.2 × 1 mm.
6. Leaves lanceolate, mostly rostrate, 3- to 4-whorled. Inflorescence 2.5—4 cm long. Corolla lobes acute. Fruit articles one at each mericarp.
7. Corolla tube 6 mm long, lobes 2.5 × 1.7 mm. Ovary short-pilose above the indistinct disc. . . . . 49. *A. halmaheirae*
7. Corolla tube 3 mm long, lobes 2 × 0.7 mm. Ovary glabrous. 50. *A. sleumeri*
6. Leaves oblanceolate, not rostrate, 4- to 5-whorled. Inflorescence 4—5 cm long. Corolla lobes less acute, 2 × 1.2 mm. Fruit articles 4—6 at each mericarp. 51. *A. markgrafii*
5. Lateral nerves 2—3 mm spaced. Inflorescence 1—1.5 cm long, very slender, peduncle 6 mm long, 0.5 mm in diam. Calyx lobes 0.7 mm long. Corolla lobes very acute, 3 × 0.5 mm. . . . . 52. *A. kendarica*
4. Leaves 3—6 cm long, 7—10 times as long as broad.
8. Leaves long-lanceolate, 4—6 × 0.6—0.8 cm. Inflorescence peduncle 1.5 cm long. Corolla tube 6 mm long, lobes 2.5 × 1.7 mm. . . . . 53. *A. stenophylla*
8. Leaves linear-lanceolate, 3—5 × 0.4—0.5 cm. Inflorescence peduncle 0.5 cm long. Flowers unknown. . . . . 54. *A. angustissima*

#### 46. *Alyxia sogerensis* Wernh. ex Sp. Moore

*A. sogerensis* Wernh. ex Sp. Moore, J. Bot. 61 (1923) Suppl. p. 31; Markgr., Nova Guinea 14 (1926) 280; Bot. Jahrb. 61 (1927) 182; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Slender liana. *Leaves* glabrous, subcoriaceous, decussate to 3-whorled, ovate, long-acuminate, base cuneate, 6—10 × 2.5—5 cm, lateral nerves subhorizontal, 0.5—1 mm distant, petiole 2—4 mm. *Inflorescence* few-flowered, peduncle 1 cm, pedicels 2 mm. *Calyx* lobes ovate, obtuse, 2 × 1 mm. *Corolla* tube 6 mm, glabrous outside, lobes ovate-acute, 2 × 1 mm. *Anthems* in the middle of the tube, 1.3 mm long. *Ovary* globose, 0.4 mm. *Mericarps* with one to several articles, 12 × 8 × 8 mm.

NEW GUINEA. West. Jayapura Dist.: Brass 12060, Idenburg R., Bernhard Camp, 1800 m. — East. Western Dist.: NGF 42715, Hongkong Hill, Ok Tedi headwaters, 5°13' S 141°08' E, 2070 m. — Eastern Highlands Dist.: NGF 29941, Okapa Subdist., Okasa, 1260 m. — Central Dist.: Forbes 591, Sogeri region, Koikoko Hill, 900 m.

**Ecology:** High mountain vegetation, mossy forest. *Araucaria* broad-leaved forest, scrub with *Podocarpaceae*.

47. *Alyxia laxiflora* Merr.

*A. laxiflora* Merr., Philip. J. Sc. 13 (1918) Bot. 54; En. Philip. 3 (1923) 328; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Slender liana. *Leaves* glabrous, subcoriaceous, 3-whorled, elliptic-acuminate, sometimes obtuse, 4—6 × 1.5—3 cm, lateral nerves indistinct, 1 mm distant, springing 60° from the midrib; petiole 3—4 mm. *Inflorescence* thyrsoid, with 1—2 nodes, bearing a simple dichasium each. *Calyx* glabrous, lobes ovate, 2 × 1 mm, ciliate, acute. *Corolla* tube 7 mm, lobes 3 × 1 mm, acute. *Anthers* below the mouth, 1 mm long. *Ovary* globose, 0.5 mm, with short bristles above. *Mericarps* with 1 article of 12 × 9 × 9 mm.

PHILIPPINES. Luzon. Ilocos Norte Prov.: PNH 18076, Mt. Darna (Merr., En. Philip. as *A. concatenata*); BS 27207, Burgos (Merr., En. Philip. as *A. luzoniensis*); BS 42240, Rizal Prov., Mt. Lumutan; BS 28371, Apayo Subprov., Mt. Sulu.

48. *Alyxia ecostata* Merr. & Quis.

*A. ecostata* Merr. & Quis., Philip. J. Sc. 82 (1954) 335.

Slender sarmentose shrub, 4—5 m. *Leaves* 4- to 5-whorled, coriaceous-fleshy, glabrous, obovate-elliptic, obtuse, base cuneate, 3—4 × 1—1.5 cm, lateral nerves quite invisible; petiole 4—6 mm. *Inflorescences* 1-noded, few-flowered (as a rule consisting of 1 central flower and 5—6 lateral ones, i.e. of a complete or incomplete trichasium); peduncle 1—1.5 cm, pedicels 2 mm long, hirtellous. *Calyx* lobes with one basal bracteole, ovate-acuminate, glabrate, ciliate, 2 × 1 mm. *Corolla* buds acute, 1.3 mm long in bud. *Anthers* 1 mm long. *Ovary* globular, glabrous. Adult flowers and fruits unknown.

PHILIPPINES. Samar: PNH 6421, Mt. Calbiga near Wright.

49. *Alyxia halmaheirae* Miq.

*A. halmaheirae* Miq., Ann. Mus. Bot. Lugd. Bat. 4 (1869) 140; Boerl., Handl. 2 (1891) 393; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166. — *A. lanceolata* Merr., Philip. J. Sc. 13 (1918) Bot. 53; En. Philip. 3 (1923) 328; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166. — *A. stellata* auct. non R. & Sch.: Koorders, Minah. (1898) 528.

Slender liana. *Leaves* 3- to 4-whorled, subcoriaceous, glabrous, lanceolate, long-acuminate, base cuneate, 4—9 × 1—2 cm, lateral nerves distinct above, 1 mm distant, subhorizontal, petiole 2—3 mm. *Inflorescence* loose, slender, with 1, rarely 2 nodes, each with 2—3 flowers, peduncle 3—15 mm. *Calyx* lobes ovate-acute, 1—1.7 × 0.8 mm, glabrous or subpuberulous. *Corolla* tube 6 mm, lobes 2.5 × 1 mm, ovate-lanceolate, bud acute. *Anthers* 1.7 mm long. *Ovary* globose, 0.7 mm, short-pilose. *Mericarps* with 1 article of 12—16 × 7—8 × 7—8 mm; if both mericarps developed, these spreading horizontally.

Type: Herbarium Utrecht No. 5647, Halmaheira.

CELEBES. South: Teysmann HB 12189, near Pangkadjene. — North: Koorders 15819, Manado, Minahassa, 500 m.

PHILIPPINES. Luzon: BS 29209, Tayabas Prov., Infanta-Sinaloan trail (type of *A. lanceolata* Merr.); Jacobs 7905, Sierra Madre Mts., WSW of Baler, 600—700 m, 15°40' N, 121°18' E, in primary forest.

MOLUCCAS. Talaud Is.: H. J. Lam 3298, Karakelong. — Morotai: Kostermans 1338. — Halmaheira: Herb. Utrecht 5647. — Ambon: De Vriese s.n.



**Note.** This is probably the *Pulassarium verum* Rumph., Herb. Amb. 5 (1747) 32, tab. 20. The fruits were described as green, therefore not full-grown. The leaves are sharply acuminate and measure '3—4 × 1 inches' as in *A. halmaheirae*, whereas those of *A. laurina* are obtuse or retuse and reach only 2.5—5 × 0.9—1.5 cm, rarely more. Correspondingly, *A. laurina* hitherto has been collected only in Waigiu and Tobie Is., *A. halmaheirae* in the Moluccas including Amboina. Merrill, Int. Rumph. (1917), compares *A. laurina* Gaud. with *Pulassarium verum*.

### 50. *Alyxia sleumeri* Markgr., n. sp.

Frutex scandens gracilis. Folia ternato-verticillata, sub-coriacea, glabra, oblongo-lanceolata, longe acuminata, basi cuneata, 6—9 × 1.5—2 cm; nervi laterales distincti, 0.5—1 mm inter se distantes; petiolus 5—8 mm. Inflorescentiae axillares, tenerae, glabrae, pauciflorae, thyrsoidae, uni- vel binodes, pedunculus 1—3 cm; bractae ovatae, 1—1.5 mm; pedicelli 3—5 mm, prophylo unico in medio ornati. Lobi calycis ovato-acuminati, 1.2 × 0.5 mm. Corollae extus glabrae tubus 3 mm longus, lobi oblique ovato-acuminati, 2.2 × 0.7 mm; alabastrum acutum. Antherae faucem attingentes, 1 mm longae. Appendices capituli stigmatici breves. Ovarium globosum, glabrum, 0.4 mm. Mericarpia uniarticulata, articuli ellipsoidei, 12 × 8 × 8 mm (nondum maturi).

**Type:** *Van Royen & Sleumer 7904* (L).

**NEW GUINEA.** West. Vogelkop: *BW 6117*, Djitmau, S. of Lake Ajamaru, 275 m, mossy forest; *Van Royen & Sleumer 7132*, E. Tamrau Mts., Aifat valley, path Waumi R. to water divide, Wamsuf area, 1200 m, primary Castanopsis forest; *BW 6871*, Aifat valley, between Arami and Suraremi, 810 m; *Van Royen & Sleumer 7904*, Nettoti Ra., S. slope of Mt. Nettoti on path Andjai-Wekari R., 1650 m, mossy Nothofagus forest; *BW 12617*, Arfak Mts., Mt. Nerimbau nr. Minjimbau, 1650 m.

### 51. *Alyxia markgrafii* Tsiang

*A. markgrafii* Tsiang, Sunyatsenia 2 (1934) 105; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166. — *A. schlechteri* Markgr., Bot. Jahrb. 61 (1928) 184, non Lév. — *A. novoguineensis* Tsiang, Sunyatsenia 6 (1941) 115.

Liana. Leaves 5- to 7-whorled, coriaceous, glabrous, oblong-obovate, obtuse, base cuneate, 9—13(—17) × 3—5(—7) cm; lateral nerves 1 mm distant, springing under 80° from the midrib, distinct above, indistinct below; petiole 2—3 mm long, bordered by the decurrent blade base. Inflorescences thyrsoid, loose, glabrous, slender, with 2—3 nodes, peduncle 3—4 cm long. Calyx lobes lanceolate, glabrous, 1 mm long. Corolla tube 4 mm long, glabrous outside, lobes ovate, 2 × 1.5 mm. Anthers 0.7 mm long. Ovary glabrous, 0.7 mm high. Mericarps moniliform, with 3—7 articles 9 × 7.5 mm. Cotyledons of embryo linear-oblong, minutely acuminate at the tip, 3 × 0.8 mm, scarcely broader than the 4 mm long radicle.

**NEW GUINEA.** West. Vogelkop: *BW 8050*, Kebar valley, 500 m; *Van Royen & Sleumer 6842*, Nerto (opposite Andjai) to Mt. Tobi, Kebar valley, 650 m. — Jayapura Dist.: *Docters van Leeuwen 9478*, Mam-beramo R., Albatros bivouac, 150 m. — East. Morobe Dist.: *NGF 3013*, Partep, Markham valley; *NGF 23306*, *Floyd 5561*, Oomsis, 6°45' S 146°48' E; *NGF 11547*, *14072*, *21664*, *29572*, *30713*, Red Hill (swamp) on rd. Oomsis-Lae; *NGF 1600*, Labu, WSW. of Lae; *NGF 3298*, Lae; *Clemens 1672*, Wareo nr. Sattelberg, 600 m; *NGF 26398*, Wakaia-Kipu trail, 7°50' S 147°10' E. — Northern Dist.: *Carr 16171*, *16180*, Kokoda, 360 m. — New Britain. *NGF 27410*, Wariai Subdist., S. of Benim village.

**Note:** Because of the homonym *A. schlechteri* Lév., Tsiang changed the name of *A. schlechteri* Markgr. into *A. markgrafii*; afterwards — in order to avoid confusion with

*A. markgrafiana* Schwartz — he called it *A. novoguineensis*. This is nomenclaturally incorrect.

**52. *Alyxia kendarica* Markgr., n. sp.**

Frutex scandens gracilis. *Folia* 3- ad 4-verticillata, glabra, subcoriacea, petiolus 2—4 mm, lamina lanceolata, obtuse acuminata, basi cuneata, 7—11 × 1.2—2.5 cm, nervi laterales 3 mm inter se distantes, angulo 70° e costa oriundi. *Inflorescentiae* axillares, pauciflorae, graciles, 2- ad 3-nodes, thyrsoidae, minute puberulae. Bractae lineares, 1 mm. Pedicelli 2 mm. *Lobi calycis* ovato-acuminati, 0.7 mm longi. *Corollae* extus glabrae tubus 3 mm longae, lobi 3 × 0.3 mm, lanceolati, acutissimi, alabastrum acutum. *Antherae* faucem attingentes, 0.7 mm longae. Appendices capitis stigmatici breves. *Ovarium* globosum, 0.5 mm altum, pubescens.

T y p e: Beccari FI 6365, SE. Celebes, Wawo-Sondu — Mar Amu, nr. Kendari, fl. May 1874 (FI).

**53. *Alyxia stenophylla* Merr.**

*A. stenophylla* Merr., Philip. J. Sc. 17 (1920) 305; En. Philip. 3 (1923) 329; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Slender liana. *Leaves* 2- to 3-whorled, subcoriaceous, glabrous, linear-lanceolate, long-acuminate at both ends, 4—6 × 0.6—1 cm; lateral nerves indistinct; petiole 2—3 mm. *Inflorescence* one-noded, with 2 dichasia; peduncle 1—1.5 cm; bracts linear, acute, 1.5 mm; pedicels 3 mm. *Calyx* lobes ovate-acute, 1.5 × 0.5 mm, glabrous, ciliate. *Corolla* tube 5—7 mm, glabrous outside, lobes 3 × 1 mm, ovate-acute, bud acute. *Anthers* 1 mm long, reaching the mouth. Stigma head with short appendages. *Ovary* globular, with some long bristles in the upper part. *Fruit* unknown.

PHILIPPINES. P a n a y: BS 35574, Capiz Prov., Mt. Salibongbong (type).

**54. *Alyxia angustissima* Merr. & Quis.**

*A. angustissima* Merr. & Quis., Philip. J. Sc. 82 (1954) 334, pl. 4.

Slender liana. *Leaves* 3- to 4-whorled, subcoriaceous, glabrous, linear-lanceolate, obtuse, but long-acuminate at both ends, 3—5 × 0.2—0.5 cm, lateral nerves indistinct; petiole 1 mm long. *Inflorescence* fine-pubescent, peduncle 8—10 mm, slender, loose. *Calyx* lobes linear, acute, 2 × 1 mm, puberulous. *Flowers* unknown. *Mericarps* with 1 article of 12 × 7 × 7 mm.

PHILIPPINES. L u z o n: PNH 8018, Mountain Prov., Mt. Polis (type).

Series II. DISCALYXIA (Markgr.) Markgr.

*Discalyxia* Markgr., Nova Guinea 14 (1926) 282, tab. 31; Bot. Jahrb. 61 (1928) 187.

Lianas. *Leaves* (3—)4—5 in a whorl, coriaceous, glabrous, many-nerved, broad-elliptic or oblong-elliptic to obovate, acuminate to rostrate at the tip. *Inflorescences* loose, long-peduncled, united into a corymbose synflorescence at the end of branches. *Corolla* tube

2—3 mm long. *Mericarps* with about 6 articles each, articles ellipsoidal, about 8—9 × 6—7 × 6—7 mm.

Type: *Alyxia ridleyana* Wernh.

Distribution: 2 species in New Guinea, with preference in mountain forests.

Note: There is one species in New Caledonia, *A. leucogyne* Van Heurck & Müll. Arg., that much resembles the two New Guinea species of this series.

#### KEY TO THE SPECIES OF SERIES 11. DISCALYXIA

1. Leaf tips mostly narrowed into a beak of 10—18 mm. Inflorescences slender, very loose, peduncle 0.8 mm in diam., in fruit 1—1.2 mm, pedicels respectively 0.4 and 0.6—0.8 mm; internodes of the inflorescences gradually diminishing till 5—6 mm (below the pedicels). Ovary essentially glabrous. . . . . 55. *A. rostrata*
1. Leaf tips suddenly narrowed into a short acumen of 4—8 mm. Inflorescences stout, more compact, peduncle 1.2 mm in diam., in fruit 2—2.5 mm, pedicels respectively 1.0 and 1.3—1.5 mm; internodes of the inflorescences gradually diminishing till 2—3 mm (below the pedicels). Ovary densely short-setose. . . . . 56. *A. ridleyana*

#### 55. *Alyxia rostrata* (Markgr.) Markgr., *n. comb.*

*Discalyxia rostrata* Markgr., Nova Guinea 14 (1926) 282, tab. 31 fig. 9—15; Bot. Jahrb. 61 (1928) 187; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166.

Stout liana. *Leaves* 5-whorled, coriaceous, glabrous, elliptic-oblong, rounded-rostrate at the tip, rounded-narrowed at the base, 14—17 × 4—6 cm; lateral nerves numerous, subhorizontal, 1 mm distant; petiole 0.5—1 cm. *Inflorescences* large, many-flowered, forming a corymbose synflorescence at the top of the branches, but their parts axillary from the axils of reduced leaves, sometimes additional ones from the axils of normal leaves; partial inflorescences thyrsoid, loose, puberulous or pubescent, 2- to 3-noded, the branches consisting of broad di- or trichasia; peduncle 4—9 cm, pedicels 3—7 mm long; bracts triangular, 2 mm long. *Calyx* lobes ovate-acute, 2.2 × 1.2 mm, pubescent or puberulous. *Corolla* tube 2 mm long, glabrous outside, lobes ovate-oblong, 1.2 × 1 mm, glabrous. *Anthers* 0.7—0.9 mm long, inserted in the middle of the tube. *Ovary* globular, 0.4—0.6 mm high, glabrous or with a few scattered long hairs near the base. *Sitigma* head subsessile, conical, scrobiculate, with short apical appendages. *Mericarps* moniliform, with up to 6 articles, these 9 × 7 × 7 mm. Embryo with oblong, obtuse, flat cotyledons, 4.5 × 0.8 mm, radicle 3 mm long.

NEW GUINEA. West. Digul Dist.: NGF 33305, Ok Walimkan, 5°02' S 140°55' E. — East. Sepik Dist.: Ledermann 12466, Felsspitze, 4°30' S 141°28' E, 1400—1500 m; Hoogland & Craven 10736, Yapa (Hunstein) R., 150 m; NGF 20646, Telefomin; NGF 28525, Feramin, 1500 m; NGF 38981, Oksapmin. — Western Highlands Dist.: NGF 37246, Kapiago, Batane, 5°22' S 142°33' E. — Morobe Dist.: Hartley 9627, Butibum R., 7 miles N. of Lae.

#### 56. *Alyxia ridleyana* Wernh.

*A. ridleyana* Wernh., Trans. Linn. Soc. Bot. 2. s. 9 (1916) 108; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 166. — *Discalyxia ridleyana* Markgr., Nova Guinea 14 (1926) 283; Bot. Jahrb. 61 (1928) 188. — *D. pullei* Markgr., Nova Guinea 14 (1926) 282, tab. 31, fig. 1—8; Bot. Jahrb. 61 (1928) 188.

Stout liana. *Leaves* 3- to 4 whorled, coriaceous, glabrous, elliptic-ovate to elliptic-obovate, short-acuminate at the tip, rounded or rounded-narrowed at the base, 6—12 ×

3.5—6 cm; lateral nerves numerous, springing about 70° from the midrib, distinct above when dry, 2 mm distant; petiole 3—5 mm long. *Inflorescences* large, many-flowered, forming a corymbose synflorescence (like *A. rostrata*), partial inflorescences thyrsoid, loose, hirtellous, 2- to 3-noded, the branches consisting of broad di- or trichasia; peduncle 4—13 cm, pedicels 3 mm long; bracts triangular, 2 mm long, caducous. *Calyx* lobes 2 × 1 mm, ovate-acuminate, hirtellous. *Corolla* tube 3 mm long, glabrous outside, lobes ovate, 1.2 × 1 mm, glabrous. *Anthers* 0.7 mm long, inserted in the middle of the tube. *Ovary* globular, 0.4 mm high, densely short-pilose. Stigma head subsessile, conical, with short apical appendages. *Mericarps* moniliform, with up to 4 articles, these (not quite ripe) 8 × 6 × 6 mm. Embryo with oblong, obtuse, flat cotyledons, 3.5 × 0.9 mm, radicle 2 mm long.

NEW GUINEA. *West*. Vogelkop: *BW* 6138, Aitinju, 275 m. — Geelvink Bay Dist.: *BW* 9592, Biak I., nr. Mansforbo; *Eyma* 4422, Wissel Lakes, Jawa R., Enarotali-bivouac Prauw, 1750 m. — Jayapura Dist.: *Brass* 11439, Bele R., 18 km NE. of Lake Habbema, 2200 m; *Sauveur & Sinke* 2570, Panggima, 4°08' S 139°21' E; *Hiepko & Schultze-Motel* 1023, 1241, *Schiefenhövel* 392, Eipomek Valley, ca. 4°25' S 140°1' E. — Snow Mts.: *Pulle* 682, Mt. Hellwig, 1750 m. — Mimika: *Boden-Kloss s.n.*, Utakwa R., 750 m.

#### Series 12. RUSCIFOLIAE Markgr., *n. ser.*

Frutices erecti. *Folia* dura, in apice vel etiam in marginibus spinifera, nervi laterales distincti. *Inflorescentiae* pauciflorae, uninodes. *Corollae* tubus 6—10 mm longus. *Articuli fructuum* ellipsoidei, 10—12 × 8 × 8 mm.

*Type*: *Alyxia ruscifolia* R. Br.

*Distribution*: 2 species, *A. ruscifolia* R. Br. in southern New Guinea, Queensland, and northern New South Wales; *A. ilicifolia* F.v.M. in Queensland.

#### 57. *Alyxia ruscifolia* R.Br.

*A. ruscifolia* R. Br., Prodr. Fl. N. Holl. 1 (1810) 470; DC., Prodr. 8 (1844) 347; F. v. M., Fragm. Phytogr. Austral. 6 (1867) 117; Benth., Fl. Austral. 4 (1869) 308; F. v. M., Descr. Notes Pap. Pl. 1 (1875) 28; Syst. Census Austral. Pl. (1882) 93; Second Syst. Census (1889) 156; Bailey, Queensl. Fl. 3 (1900) 979; Compreh. Catal. Queensl. Pl. (1909) 317; Pich., Mém. Mus. Hist. Nat. Paris n.s. 27 (1948) 165. — *Gynopogon ruscifolius* K. Sch. in E. & P., Nat. Pfl. Fam. 4, 2 (1895) 151.

An intricate erect shrub, up to 2 m. *Branchlets* hirsute. *Leaves* 3- to 4-whorled, glabrous, hard, ovate-acute with an apical spine, 2—2.5 × 1 cm (sometimes much narrower, 1.5—2.5 × 0.3—0.4 cm); lateral nerves distinct above, strong, straight, 1 mm distant, springing by 30° from the midrib; petiole 1—2 mm long. *Inflorescences* hirsute, peduncle 2—3 mm, one-noded, with 1—5 flowers. Bracts linear, pungent, 2—3 mm. Flowers sessile. *Calyx* lobes ovate, acute, 1.5 × 0.7 mm. *Corolla* tube 6 mm long, glabrous outside, lobes linear, 3 × 1 mm, bud acute. *Anthers* 1.2 mm, inserted in the middle of the tube. Stigma head conical. *Ovary* dome-shaped, 0.8 mm, setose. *Mericarps* with one article of 10—11 × 8 × 8 mm.

SE. MOLUCCAS. *Aru* Is. *Buwalda* 5390, Pulu Tranggan, Kp. Ngaibor.

NEW GUINEA. *West*. Digul Dist.: *Van Royen* 4800, from Bupul to Merau R.; *Anta* 53, rd. to Kakajau village. — *East*. Western Dist.: *Brass* 6510, Mabaduan, Fly R.; 8549, Tarara, Wassi Kussa R.; *Macfarlane s.n.*, Baxter's R. = Mai Kussa R. (ex F. v. Müller).

**E c o l o g y:** Rain forest edges, dry and brushy, or swampy, in both habitats abundant.

**N o t e:** Some of the plants (*Buwalda 5390*, *Brass 8549*) resemble somewhat the Australian var. *pugioniformis* Cunn. by their narrow leaves, but show normal leaves at the same branches.

#### INSUFFICIENTLY KNOWN SPECIES

*Alyxia composita* Warb., Bot. Jahrb. 13 (1891) 404: type lost.

*Alyxia glabra* Merr., Philip. J. Sc. 13 (1918) Bot. 53: type apparently lost.

*Alyxia heterophylla* Markgr., Bot. Jahrb. 61 (1928) 182: type lost.

*Alyxia monticola* C. B. Rob., Philip. J. Sc. 6 (1911) Bot. 356: no type seen.

*Alyxia obovatifolia* Merr., Philip. J. Sc. 17 (1920) 306: type apparently lost.

*Gynopogon hunteri* Roxb., Hort. Bengal. (1814) 19, *nomen nudum*.

#### EXCLUDED NAMES

*Alyxia coriacea* Wall. in Roxb., Fl. Ind. ed. Carey 2 (1824) 541. — *Gynopogon coriaceus* K. Schum. in E. & P., Nat. Pfl. Fam. 4, 2 (1895) 151 = *Melodinus coriaceus* Oliv. — Mr. F. N. Hepper of Kew kindly compared the type.

*Alyxia macrocarpa* Koord., Minah. (1898) 528, 622 = *Melodinus orientalis* Bl., according to the type in L.

*Alyxia stellata* var. *latifolia* Bl., Bijdr. (1826) 1031. — *Alyxia reinwardtii* Bl. var. *latifolia* Bakh. f., Blumea 6 (1950) 390: the type sheet contains a small sterile twig of *Alyxia reinwardtii* Bl. with leaves of normal size and two large sterile branches that cover almost the whole sheet, with really broad leaves. These represent not an *Alyxia*, probably an *Ochrosia*.

*Alyxia torulosa* Boerl., Bull. Jard. Bot. Btzg. 5 (1900) 12 = *Chilocarpus torulosus* (Boerl.) Markgr., Blumea 19 (1971) 162.

#### INDEX TO SPECIES NAMES OF ALYXIA

New names of taxa are in **bold type**; synonyms in *italics*. Numerals refer to numbers of taxa. Insufficiently known species are indicated by 'Dub.', excluded ones by 'Excl.'.

*Alyxia* Banks ex R.Br.  
*acuminata* K. Sch. 14  
     var. *lanceifolia* Markgr. 34  
     var. *montana* Markgr. 14  
*angustifolia* Ridl. 11  
*angustissima* Merr. & Quis. 54  
*arfakensis* Kan. & Hat. 32  
*aromatica* Reinw. ex Bl. 13e

*atjehensis* Markgr. 20  
*blancoi* Merr. 34  
*cacuminum* Markgr. 38  
*callicola* Markgr. 43  
*cinerea* Bakh. f. 13a  
*clemensiae* Markgr. 24  
*clusiacea* (Baill.) Pichon 1  
*composita* Warb. Dub.

- concatenata* (Blanco) Merr. 19  
*confertiflora* Merr. 1  
*coriacea* Wall. Excl.  
*defoliata* Markgr. 30  
    subsp. *defoliata* 30a  
    subsp. *orientalis* Markgr. 30b  
*ecostata* Merr. & Quis. 48  
*floribunda* Markgr. 26  
*forbesii* K. & G. 13g  
*fragrans* Merr. & Perry 29  
*ganophylla* Markgr. 5  
*glabra* Merr. Dub.  
*halmaheirae* Miq. 49  
*heterophylla* Markgr. Dub.  
*induta* (K. Sch.) Markgr. 5  
*kabaenae* Markgr. 28  
*kendarica* Markgr. 52  
*kinabaluensis* Markgr. 10b  
*lamii* Markgr. 39  
*lanceolata* Merr. 49  
*lata* Markgr. 4  
*laurina* Gaud. 16  
*laxa* Markgr. 4  
*laxiflora* Merr. 47  
*linearis* Markgr. 45  
*lucida* Wall. 13f  
    var. *meiantha* Stapf 13g  
*luzoniensis* Merr. 17  
*macrocarpa* Koord. Excl.  
*maluensis* Markgr. 22  
*markgrafiana* O. Schwartz 5  
*markgrafii* Tsiang 51  
*microphylla* Markgr. 42  
*monilifera* Vidal 19  
*monticola* C.B. Rob. Dub.  
*mujongensis* Markgr. 9  
*multistriata* Markgr. 25  
*novoguineensis* Tsiang 51  
*obovatifolia* Merr. Dub.  
*odorata* (non Wall.) K. & G. 13f.  
*oleifolia* K. & G. 10  
    var. *oleifolia* 10a  
    var. *tenuifolia* Ridl. 10b  
*pachyphylla* Merr. 6  
*pagonensis* Markgr. 12  
*palawanensis* Markgr. 31  
*parvifolia* Merr. 18  
*pilosa* Miq. 5  
*pugio* Markgr. 44  
*pullei* Markgr. 8  
*pumila* Hook.f. 13c  
*punctata* Kan. & Hat. 40  
*purpureoclada* Kan. & Hat. 33  
*quinata* Miq. 13f.  
*reinwardtii* Bl. 13  
    var. *cinerea* (Bakh.f.) Markgr. 13a  
    var. *insularis* Markgr. 13b  
    var. *latifolia* (Bl.) Bakh.f. Excl.  
    var. *lucida* (Wall.) Markgr. 13f  
    var. *meiantha* (Stapf) Markgr. 13g  
    var. *obovatulata* Markgr. 13d.  
    var. *pumila* (Hook.f.) Markgr. 13c.  
    var. *reinwardtii* 13e  
*reinwardtii* (Bl. p.p.) Kerr 13f  
*retusa* Merr. 3  
*revoluta* Merr. 2  
*ridleyana* Wernh. 56  
*rosmarinifolia* Merr. & Quis. 45  
*rostrata* (Markgr.) Markgr. 55  
*royeniana* Markgr. 41  
*ruscifolia* R.Br. 57  
*scabrida* Markgr. 27  
*schlechteri* Markgr. 51  
*scortechinii* K. & G. 21  
*selangorica* K. & G. 21  
*semipallescens* F.v.M. 39  
*sibuyanensis* Elm. 2  
*sleumeri* Markgr. 50  
*sogerensis* Wernh. ex Sp. Moore 46  
*spanogheana* Miq. 35  
*spicata* R.Br. 15  
*stellata* F.-Vill. 19  
    var. *latifolia* Bl. Excl.  
*stellata* (non R. & S.) DC. 13f  
*stellata* (non R. & S.) Koord. 49  
*stellata* (non R. & S.) Miq. 13g  
*stenophylla* Merr. 53  
*subalpina* Markgr. 37  
*sulana* Markgr. 36  
*tetraquetra* Markgr. 23  
*torulosa* Boerl. Excl.  
*triptera* Merr. 21  
*winckelii* Bakh.f. 7  
*Brabejum concatenatum* Blanco 19  
*lucidum* Blanco 34  
*Discalyxia pullei* Markgr. 56  
*ridleyana* (Wernh.) Markgr. 56  
*rostrata* Markgr. 55  
*Fagraea tetragona* Spanoghe 35  
*Gynopogon acuminatus* K. Sch. 14  
*coriaceus* (Wall.) K. Sch. Excl.  
*hunteri* Roxb. Dub.  
*indutus* K. Sch. 5  
*laurinus* (Gaud.) K. Sch. 16  
*monilifera* (Vidal) Merr. 19  
*pumilus* (Hook.f.) K. Sch. 13c  
*reinwardtii* (Bl.) Koord. 13e  
*ruscifolius* (R.Br.) K. Sch. 57  
*Paralstonia clusiacea* Baill. 1  
*Pulassarium verum* Rumph. 49